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THE
SECOND SUPPLEMENT
TO THE
PENNY CYCLOPAEDIA
OF
THE SOCIETY
FOR THE
DIFFUSION OF USEFUL KNOWLEDGE.

COMPLETE IN ONE VOLUME.

LONDON:
PUBLISHED BY KNIGHT & CO., 90, FLEET STREET.
MDCCCLVIII.
LONDON:
BRADBURY AND EVANS, PRINTERS, WHITEFRIARS.
NOTICE.

THE FIRST SUPPLEMENT of the 'Penny Cyclopædia,' in Two Volumes, was published in 1846. THE SECOND SUPPLEMENT, now completed in One Volume, follows the same plan as that of the original Work, comprising under one Alphabetical Arrangement, the accumulated information of the twelve years which have elapsed since the publication of the First Supplement. A limited number only of this Volume has been printed; and it will not be kept on sale after that number has been disposed of.

CHARLES KNIGHT.

May 28, 1858.
SECOND SUPPLEMENT
OF
THE PENNY CYCLOPAEDIA
OF
THE SOCIETY FOR THE DIFFUSION OF
USEFUL KNOWLEDGE.

(After the abridgment & 1, in the references and elsewhere, refers to the First Supplement; § 2, to the present Second Supplement. The references without either of these additions are to the 'Penny Cyclopaedia' as distinct from the two Supplements.)

AAC
ABO

AACHEN. [ANT-S-CHAPPEL.]
ABACO. [BAHAMAS.]
ABATÉMENT. Pleas in abatement for misnomer have been abolished (3 & 4 Will. IV. c. 42), and an objection thus taken to the nonjoinder or misjoinder of parties is no longer of any avail in a civil action, the courts having now express powers of amendment. (Common Law Procedure Act, 1852.) A similar observation applies to pleas in abatement to an indictment or information. (14 & 15 Vict. c. 106)

ABEY HOLME. [CUMBRIA.]
ABBEYLEIX. [QUEEN'S COUNTY.]
ABBOTS BROMLEY. [STAFFORDSHIRE.]

ABEKAHKTUH, a large walled town, on the west bank of the river Agonee, which separates it from the kingdom of Dahomey, about 60 miles inland from Lagos, in the Right of Benin, and about 160 miles from Abomey, the capital of Dahomey. It is in the petty kingdom of Egba, which is subdiy to Yorrobi, but the town itself, which has sprung up within the last forty years, is independent, and is governed by a chief who is not a king. The inhabitants amount to upwards of 50,000, and are composed of the natives of Egba, a great number of liberated blacks, many of them from Sierra Leone, and several missionaries, who report that their lives have been highly successful. The King of Dahomey is more than once attacked the town in vain. In 1848 one of his Amazonian regiments was almost entirely destroyed by the Abekahktuhs in one of these attempts. In June, 1856, when Captain E. E. Forbes and Mr. Becroft were at Abomey, Mr. Becroft was told by the King himself to warn the missionaries to withdraw, as he was going to make war upon the town, when it was explained to him that the town was in alliance with Great Britain, and that there were great numbers of free negroes and several missionaries there. Nevertheless, he invaded their territory at the head of a large hostile force, a great part consisting of Amazons, and met with a severe defeat under its walls, on March 3rd, 1856, which is said to have greatly crippled his power. The town of Abekahktu, which means 'under the stone,' has reference to a large natural cave within the town walls, wherein the market is held. A new species of silk from Bouma in the interior, and a peculiar description of wool, from Quota to the westward of Abekahktu, have been introduced as articles of trade into England, and are likely to prove valuable.

ABECKETT, GILBERT ABBOTT, born in Golden-square, London, in the year 1810, was the son of a respectable merchant, and was educated at Westminster School. He very early displayed great talent as a humourist. As early as 1825, his own dramatic productions, in prose and verse, but all in burlesque character, were published in Duncombe's 'British Theatre;' in 1828-29 nine more appeared in Cummeland's 'British Theatre;' and in 1837 four others were printed in Webster's 'Acting Drama,' most of which had attained some success on the stage. In 1843 he produced 'The Mirror, or Hall of Statues,' a musical burlesque. In connection with the drama, also, he published in 1844 'Scenes from the Rejected Comedies by some of the Competitors for the Prize offered by Mr. Webster.' These 'Scenes' were a series of parodies upon living dramatists (including one of himself), which had appeared in 'Punch' previous to their publication in a separate form. In 1846 he published 'The Quizzology of the British Drama.' In conjunction with his schoolfellow, Mr. Henry Mayhew, he started several comic periodical works, of which 'Figaro in London,' begun about 1830, was undoubtedly the precursor of 'Punch.' When that work had swallowed up its rivals, Mr. A. Beckett became a constant contributor to it, and the adventures, the epistles, and anecdotes of Mr. Dunup were among the most laughable morsels of that publication. He took a pride in the work, and it was his boast that, till the period of his death, no number appeared without something, however small, from his pen. His humour was without malice, and displayed a varied reading, with considerable knowledge of the law. In the midst of his exhibitions of fancy he had not neglected the more serious studies of his profession. He was trained as a lawyer; and in March 1846 his reputation induced Mr. Charles Buller to intrust to him the investigation of the iniquities practised in the Andover Union workhouse. This he conducted in a satisfactory manner, and in his report he displayed a clear and solid judgment in sober and well-chosen language. Some leaders in 'The Times' on the same subject have been also attributed to him. He had previously been an occasional contributor to that journal. His conduct of the Andover inquiry led to his appointment in 1849 as magistrate of the police-court of Greenwich and Woolwich, whence he was removed in 1850 to that of Southwark—positions which he held in an irreproachable manner. Besides an edition of 'The Small Debts Act, with Annotations and Explanations,' published in 1846, he produced the 'Comic Blackstone,' which was published in 1844-46; a 'Comic History of England,' published in monthly parts, forming a volume completed in 1848; and a 'Comic History of Rome,' also in monthly parts, completed in 1852. He likewise, in 1845, edited George Cruikshank's 'Table Book.' After a very short illness he died at Bonogleghe, on the 26th of April 1866.

ABERAVON. [Glamorganshire.]
ABERAYRON. [Cardiganshire.]
ABERDAH. [Glamorganshire.]
ABERNETHY. [Perthshire.]
ABORTION, a term used in Botany and Horticulture. In Botany, Abortion is employed to express the absence of an organ in relation to an ideal type. Thus the flowers of
Sorophorariaeae and Lamiaeae have their sepals and petals arranged in the num-b-r five. According to a very general law, one stamen equals in number the petals and sepals, but in this case they do not. In the majority of instances the stamens are but four; hence it is said that one stamen is aborted, or there is an abortion of one stamen. The want of harmony between the parts of the flower generally is thus spoken of. In other instances when the stamens are numerous, and the seeds only one, two, or three, the remaining ovules are aborted.

In horticulture, the premature development of the fruit, or any defect in it, is called Abortion.

ABRAXAS, a genus of Nocturnal Lepidoptera, to which belongs the common Magpie Moth, A. grandulatia. The caterpillar of this moth attacks the leaves of gooseberry and currant bushes at the beginning of the summer. It is of a yellowish-white colour, with an orange stripe on each side, and covered with black spots. The chrysalis is black, relieved at its pointed end with orange circles. The expanded fore-wings of the perfect insect measure about one inch and a half across. The wings are of a yellowish-white colour, variously spotted with black. The fore-wings have a band of pale orange. The body is orange, spotted with black. The eggs are deposited on currant or gooseberry leaves in July or August, and the caterpillars are hatched in September. To the fore-wings of these caterpillars they may be picked off, or dusted with the powder of white heliolebe, or the leaves of the plants attacked may be burned.

ABROMA (from a & Broma, 'not fit for food,' in opposition to theodroma, 'food for gods'), a genus of plants belonging to the family Papilionaceae. The species composition of small trees, with hairy lobed leaves and extra-axillary or terminal few-flowered peduncles at the tops of the branches. *Abroma augusta* is a handsome tree, with drooping purple flowers, and has the peduncles opposite the leaves. It is a native of the East Indies. The fibrous tissue of the bark of this plant is manufactured into cordage.

ABRUS (from a & Brous, soft), a genus of plants belonging to the papilionaceous division of the order Leguminosae. The calyx is greenish with the upper expanded, and is a legume oblong, compressed, and 4-5-seeded. There is but one species, *A. precatorius*, which is a delicate twining shrub, with abruptly pinnate leaves, bearing many pairs of leaflets. It is a native of the East Indies, but is also found in the tropical part of Africa and America, where perhaps it has been introduced. The seeds of the commoner variety are red, with a black spot, whilst various varieties produce various coloured seeds. These seeds are in much request as ornaments among those of the cultivated garden where they are struck as beads, with shells, and other hard seeds. They are brought to Europe from Guinea and the East and West Indies. They are used frequently as beads for rosaries; hence the name *precatorius* given to this species. The leaves and flowers are also used in the West Indies for secretaries which characterises the liquorice plant (*Oligyryxa glabra*). In the West Indies it is called Wild Liquorice, and used for the same purposes as the common liquorice. The seeds have been accused of possessing narcotic properties, but this is an error. When swallowed they are very digestive.

ABSINTHINE. [Chemistry, S. 2.]

ABUTTIONS. [Chemistry, S. 2.]

ACERAS, a genus of Orchidaceae Plants, of which one species is found growing in Great Britain. It is a small plant, from 8 to 12 inches in height. It has a long lax spike of greenish-yellow flowers, the parts of which are so arranged as to give them the appearance of the small figure of a man: hence this plant has been called the *man-in-the-hand*.

ACETAL. [Chemistry, S. 1.]

ACETONE. [Chemistry, S. 1.]

ACETONITRILE. [Chemistry, S. 2.]

ACHILL, an island off the west coast of the barony of Burrisboole in the county of Mayo, in Ireland. With the adjoining peninsula of Corraun Achill it constitutes the parish of Achill, and one electoral division of the Poar-Law county of Mayo. It is separated from the coast of Europe by a narrow arm of the sea, called Achill Sound, connecting Clew Bay with Blackwood Harbour. The length from Achill Beg island at the extremity of the Sound, on the south, to Achill Head, at the Atlantic extremity of the island on the west, is 152 miles, breadth from north to south, 8 miles, elevation of the south side to Ridge Point in Blackwood Bay on the north, 192 miles. It lies between 53° 51' and 54° 0' N. lat., and 5° 55' and 10° 15' W. long. The area is 33,268 acres. The population of Achill is about 4000 persons.

The island, the name of which signifies ' Eagle,' is in form nearly a right-angled triangle, of which one side extends from south to north, facing the mainland, from Achill Beg to Ridge Point; another from east to west, from Ridge Point to Blackwood Harbour; and the third side, forming a re-entrant irregular coastal-line of about 35 miles, and having the Bay of Tramore about midway, is washed by the Atlantic. The surface, which is excessively wild, barren, and boggy, rises towards the north and west into mountains of 2000 feet and upwards; and at one point near the western extremity of the island, Toucraghannah, the cliff towards Blackwood Bay descends precipitously from the highest point of the island, forming a shelving face of rock, of the extraordinary height of 2928 feet. Achill Head, at the extreme west, consists of a narrow ridge of rock, of about a mile in length, and from 300 to 400 feet in height, the summit of which is in some places but a few yards in width. The coast on the south-western side is also very precipitous: the cliff at Doeega Head, which forms the eastern boundary of Tramore Bay, rises 813 feet over the Atlantic, and is nearly perpendicular. The geological structure of the island is simple; the whole being a mass of mica slate.

ACCRINGTON, Lancashire, a manufacturing town of recent growth, in the parish of Whalley and higher division of Blackburn hundred, is situated in a deep valley surrounded by hills on the banks of the Hindburn, or Accrington brook, in 53° 45' N. lat., 2° 22' W. long, distant 19 miles N. from Manchester, 207 miles N.W. by N. from London by road, and 225 miles by the railways to East and West Lancashire Railways. The population of the town in 1851 was 7481. The livings are perpetual curacies in the archdeaconry and diocese of Manchester.

ACCRUING possesses two churches of the Establishment: one, on the castle, is a plate building; the other, Christ Church, is a spacious gothic edifice erected in 1833, at an expense of about 8000£. The Wesleyan Methodists, Independents, Baptists, Roman Catholics, and Swedish- gians have places of worship. There are national schools, and the parish church has one of the S. E. parsonage rooms. The town is paved, lighted with gas, and well supplied with water. The general aspect of the town is good, and the inhabitants claim for it the distinction of being the cleanest town in Lancashire. It requires, however, many sanitary improvements, especially in the smaller streets and lanes.

The drainage is very defective. Accrington is considered to be the centre of the cotton-printing business. There are two large print works, employing upwards of 150 persons, and extensive bleaching works. The neighbouring coal-mines employ many of the inhabitants.
achly a genus of Cryptogamons Plant, belonging to the order Gomeraea. The species of this genus are very numerous, and, although not useful, they are of many extensively cultivated, on account of the beauty of their flowers. In consequence of their general color, a great many varieties of the species are becoming known. After flowering, the stems die down; and the tubers should be dug up, and kept free from frost and wet till January, when, by planting them in succession, flowers may be obtained till the summer. They may be planted in a mixture of loam and leaf-mold, with a little silver sand. They can be placed out in the summer, but require shading at hot days.

ACHLYA, a genus of Cryptogamons Plant, belonging to the order Gomeraea. It is a genus of a single species, which expands at the end into a large cell, which is cut off from the lower portion of the tube by the formation of a partition. In this enlarged cell a circulation of granular particles has been observed. In the course of time these cells have become larger and larger, and the tube of the plant eventually bursts at some spot, and allows of the escape of the enclosed cells; but before this takes place the cells in the interior move about, and, after their escape, exhibit for a considerable time an active movement. They are good examples of the Zoophyta. The column attaches itself to some fitting object, and grows into little plants, like their preceeding. A similar process goes on in most of the Algae, but not so easily observed as in this case.

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principal apartments open. Beyond this patio there is another, round which the private apartments are built, and beyond this another, where the parade, kitchen, servants' rooms. The patios are frequently roofed over with treliss-work, along which vines are trained to grow; and when water is abundant there is a pond or a jet-d'eau, or both, in the centre. To go from one part of the house to another, without leaving the main building, or passing the Plaza, and the Alameda, during the hours when they are frequented, are the chief sources of amusement and gratification, and this they often afford in a high degree; as during the hours of recreation in the evening the whole population, rich and poor, flock thither, with the exception of the very old or very young, who however indemnify themselves by enjoying the fresh air on the flat roofs of the houses. San-Felipe-de-Aconcagua, the capital of the province, situated on the right bank of the river Aconcagua, at a distance of 20 miles from Santiago, the capital of Chili, and the same distance W., by S. from the Peak of Aconcagua, has about 13,000 inhabitants. Santa-Rosa, 20 miles higher up the river, and E.S.E., of San-Felipe, has a population of 6000. Petorca, situated 33 miles W. from Santiago, and in the same mining district of the province, is a small place, with hardly more than 1000 inhabitants.

The road from Santiago to San-Felipe crosses the range of hills called Cuesta-de-Cachabuco at the height of 2000 feet above the sea, and is continued northward through Petorca to La Serena. Another road leads down the valley of the Aconcagua through Quillota to Valparaiso, distant about 60 miles. The communication with the Argentine Provinces is kept up by the road over the Andes by the Aconcagua, and across the Andes by the Pass of La Cumbre (12,464 feet above the sea) through Uspallata to Mendoza. Another road, branching off from the northern road at the village of San-Antonio, about 10 miles N. from San-Felipe, and running up the left bank of the Putaendo, crosses the Andes by the Pato Pass, and leads to the Argentine town and province of San-Juan. The road by the Cumbre Pass is open for mules from November to the end of May; for the rest of the year it is closed to all but foot-passengers, and the journey is then made by the dangerous Pass of the Pato Pass that General San Martin marched over the Andes into Chili with the army of Buenos Ayres in 1817.

(Miera, Travels in Chili and La Plata : Meyen's Reise in das Amazonenflusse ; Travels and Adventures in the Plata and Amazonerflusse ; Paris, Buenos Ayres and the Provinces of La Plata ; Surveying Voyages of the Adventure and Beagle.)

ACONITINA. [CHEMISTRY. S. I.]

ACORINE, ACORIDEE, or ACORACEAE, a small natural order of Endogens, with the following essential character:—The flowers are hermaphrodite, surrounded with scales. The spathe is leaf-like, but not rolled up. The stamens are complete, placed opposite the scales, and have two-celled anthers which are turnedit inward. The ovary is distinct. The fruit is baccate, juicy at first, but finally juicyless. The seeds have the embryo seated in the axis of a copious alburnum. The rootstock is jointed; the leaves sword-shaped, and embracing each other in the bud. Such is the character given this order, which was first separated from Arecaceae by Agardh, and the separation was afterwards adopted by Schott, Link, and Lindley. The genera assigned to this order by Lindley were Acorus, Gymnostachys, Tapistrum, and Aegiphila. The two last genera are now assigned by the author must be regarded as a small group of plants in its geographical distribution is confined to the eastern hemisphere. None of them have the acrid properties of some of the Arecaceae. The Acorus Calamus is a British plant, a common vegetable, having small rhizomes, which when dried, are much used in medicine as a stomachic remedy. ACORINE (from Acorus, indistinct), a division of the class Radiata, adopted by Owen, and applied to the Alcaceae, the Polysperma, except the Bryoxoa, the Polyspasia, and certain forms of Eriocaulon, in some of which are the indications of a nervous system decided, and they constitute the lowest forms of the Radiate group of animals.
ADDITIONS.

ADDITIONS DISEASE. [MEDICINE. & 2.] ADMINISTRATION AND ADMINISTRATOR. The whole jurisdiction of the Ecclesiastical Courts in the grant and withdrawal of administrations, and the superintendence of administrators, has been transferred to the Court of Probate. (20 & 21 Vict. c. 77. [PROBATE, Court of, & 2.]) The customs of Loundon, 1696, (I. C. vol. i. p. 120) have been abolished, and the distribution of the estates of intestates that were previously ordered throughout England. (19 & 20 Vict. c. 94; 'Blackstone's Comm.', Mr. Kerr's ed., vol. ii. p. 564.)

ADMIRALTY, COURT OF. The jurisdiction of this Court has been extended, and a ship's, an action, and a writ of peculiar jurisdiction, c. 89 & 10 Vict. c. 96. Questions relating to the action and capture of ships may also be determined by this Court or the Vice Admiralty Courts abroad. (13 & 14 Vict. c. 92.)

ADOLPHUS, JOHN, was born in 1770 and died July 17, 1845. Mr. Adolphus was a barrister of high standing in the criminal courts, and at his decease was father of the Old Bailey bar. He was a keen advocate, a fluent speaker, and a good lawyer. His practice, previously very considerable, was highly increased by the manner in which he distinguished himself as leading counsel for Thistlewood and the other prisoners charged with a treasonable conspiracy in 1820, though he was retained on their behalf only a few hours before they were hanged. Mr. Adolphus is best known as the author of the 'History of England from the Accession of George III.', originally published in 3 volumes in 1805, but which he subsequently revised and greatly extended. Of this enlarged edition the seventh volume appeared in 1839. The life of the author was a long one, and the conclusion has not been published. It is a work of considerable research and very carefully executed, but it does not exhibit very high historical powers. He was also the author of 'Biographical Memoirs of the French Revolution'; 'Political State of the British Empire', 4 vol. 1818; 'Memoirs of John Banister'; and some fugitive pieces and pamphlets.

ADULTERY. The action of damages for criminal conversation is now supported by the Act of 1854, 5 & 6 Vict. c. 17, creating the 'Court for Divorce and Matrimonial Causes.' The injured husband, in applying to this Court for a divorce or a judicial separation, may claim damages, which however can only be awarded to him by the verdict of a jury, and the Court may then direct in what manner the damages are to be disposed of; for the whole or any part thereof may be settled on the children of the marriage, or as a provision for the maintenance of the wife. [DISSORCE, § 2; SEPARATION, JUDICIAR, § 2; HUSBAND AND WIFE, § 2.]

Ag a genus of plants belonging to the order Umbellifere. One species, _A. podagracia_, is common throughout the whole of Europe, and grows abundantly in Great Britain. It has a stem one or two feet high, with furrows. The leaves are two or three forked, and the entire fruit is covered with a net-like veil, having the acutely serrate. It has a creeping root, and grows in damp places. Although well known, and having the names of Goat-Weed, Ash-Weed, Herb Gerard, and Wild Masterwort, it seems to possess no medicinal properties. Linnaeus says that it is boiled when young, and eaten as greens in Sweden.

ETHERS, SILICIC. [CHEMISTRY, § 1.]

AFFIRMATION (in Law). Every person who has conscientious objections to taking an oath, may owe to be permitted to make a solemn affirmation in lieu thereof, the effect of which is the same as if the testimony were given oath. (Common Law Procedure Act, 1854.)

AFFRE, DENIS AUGUSTE, archbishop of Paris, was born at St.-Borne, in the department of Tarn, Sept. 27, 1793. At the age of 18, he entered the seminary of St. Sulpice, and in 1818, was ordained priest, and discharged a variety of ecclesiastical functions till he became archbishop of Paris in 1851. Although a man of great studious learning, and the author of various treatises (among which was one on Egyptian hieroglyphics), he would scarcely have found a place in the history of his times, but for the lamentable circumstances of his death on the 27th June, 1848. Paris was then in a state of commotion through the news that the archbishop had been garrisoned with a vast body of insurgents. The archbishop was induced to apply to General Cavaignac, proposing to stand between the contending bodies as a messenger of peace. The general told him that the course was full of danger. 'My life,' he replied, 'is of small consequence.' Some hours afterwards the firing of the soldiery having ceased at his desire, the archbishop mounted a barricade erected at the entrance of the Rue Penthievre, where he was killed. He was a national garde, wearing a workman's dress, carrying in his hand a green branch as an emblem of peace; and he had at his side a faithful servant named Pierre Sellier. The devoted ecclesiastic was not received with the confidence that he expected to inspire. Some of the insurgents thrust out their hands, but others remained silent, while others groaned and hooted. The prelate endeavoured to speak a few words; but the insurgents, fancying themselves betrayed, seized him, and threw him on his back, and that they would avenge him. 'No, no, my friends,' he replied; 'there has been blood enough shed; let mine be the last that is spilt.' He was carried to the archiepiscopal palace, and died the same day. The National Assembly issued a decree announcing a profound grief at the event of his death, and his public funeral took place on the 7th of July, amidst the deepest feelings of popular regret. (Nouvelle Biographie Universelle, 1832.)

AFREEDIA KHAN, or Afrared, sometimes spoken of under the more general name of Kyber or inhabit the Kyber hills on the confines of Cabul and the Panjab. They command the passes in these hills, for a safe conduct through which their Maliks, or chiefs, consider themselves entitled to demand a toll for the men and mules that pass through them. Now, however, they were formerly paid by the rulers of Cabul, and the non-payment of it after the restoration of Shah Soojah to the throne excited the furious hostility of the Afreedia against the British and their auxiliaries. They resisted the march of Colonel Wade and the other columns through the passes in July, 1839, but were compelled to evacuate the fort, Ali-Musjid, the key of the pass, which, with other posts between Pesahwar and Jellalabad, was garrisoned by small detached parties. At a subsequent period of the Afghan war, January 19, 1849, they defended two Scapes under Brigadier Wild from Pesahwar to the relief of two other Sepoy regiments under Colonel Moseley in Ali-Musjid, which had seized that fort some days before, and had been robbed of their provisions on their way. Cut off from all communication with the brigadier, and short of provision, Moseley evacuated the fort on the 24th, which was immediately seized by the Afreedia. On General Pollock's advance from Pesahwar to the relief of Jellalabad, in the spring of 1842, the Afreedio came out to meet him, and left him with cavalry and Dhaka for 50,000 rupees; but Pollock chose to force his way, sweeping the heights on each side of the defile with his light troops, whilst the main body advanced through the pass, having demolished the barrier raised by the enemy. When they crossed the entire range, it was found the Afreedia had evacuated it; they then held by a strong force till the final withdrawal of the British troops from Afghanistan, when it was blown up. We next hear of the Afreedia in connection with another pass on the road from Pesahwar to Kohat, leading to the Salt Range. On February 2, 1850, about 1000 Afreedia plundered the camp of a party of British Sappers employed in making a road through this pass, about 32 miles south from Pesahwar, and killed several of the men. To avenge this massacre a strong force, under Colonel Bradshaw, stormed the hills in the neighbourhood, destroying six villages and a great number of the enemy, who however made some resistance on the return of the troops through the passes.

To the west of the Kyber hills, on the Cabul side, the Momand clan dwells along the banks of the Cabul river. Their chief place, Lalpoorab, the residence of the Malik, is opposite Daka. 

AFRICA. At the period when the article Africa in the 'Penny Cyclopaedia' was written, the descent of the Quorra, or Neger, had recently been accomplished by the brothers Richard and John Lander. In a subsequent article, Quorra, additional details are given respecting the river and the present state of the country. The Quorra is said to have been reduced to the year 1840. At that time an expedition was in preparation by the British government, the object of which was to check and supersede the foreign trade in slaves by the establishment of a commerce along the banks of the Quorra, which should be more beneficial to the native chiefs.
than the cruel traffic in slaves. This expedition, consisting of three steam-vessels, began the ascent of the river in 1841, but was compelled to abandon it, it being impossible to seize all the tributaries. When the river was attempted again in 1843, the expedition, consisting of three vessels, was under the command of Captain Young, who, in March 1844, ascended the river to the latitude of 14° 20' S., where they were forced to return by the want of provisions. The next attempt was made in the years 1846 and 1847, under the command of Captain Young, who ascended the river to the latitude of 17° 20' S., but was compelled to return to the coast.

The next attempt to ascend the river was made in the summer of 1848, under the command of Captain Young, who ascended the river to the latitude of 20° 30' S., and the expedition was again returned to the coast by the want of provisions. The next attempt was made in the summer of 1849, under the command of Captain Young, who ascended the river to the latitude of 25° 30' S., but was compelled to return to the coast by the same cause.

The next attempt was made in the summer of 1850, under the command of Captain Young, who ascended the river to the latitude of 30° 30' S., but was compelled to return to the coast by the same cause. The next attempt was made in the summer of 1851, under the command of Captain Young, who ascended the river to the latitude of 35° 30' S., but was compelled to return to the coast by the same cause.

The next attempt was made in the summer of 1852, under the command of Captain Young, who ascended the river to the latitude of 40° 30' S., but was compelled to return to the coast by the same cause. The next attempt was made in the summer of 1853, under the command of Captain Young, who ascended the river to the latitude of 45° 30' S., but was compelled to return to the coast by the same cause.

The next attempt was made in the summer of 1854, under the command of Captain Young, who ascended the river to the latitude of 50° 30' S., but was compelled to return to the coast by the same cause. The next attempt was made in the summer of 1855, under the command of Captain Young, who ascended the river to the latitude of 55° 30' S., but was compelled to return to the coast by the same cause.

The next attempt was made in the summer of 1856, under the command of Captain Young, who ascended the river to the latitude of 60° 30' S., but was compelled to return to the coast by the same cause. The next attempt was made in the summer of 1857, under the command of Captain Young, who ascended the river to the latitude of 65° 30' S., but was compelled to return to the coast by the same cause.

The next attempt was made in the summer of 1858, under the command of Captain Young, who ascended the river to the latitude of 70° 30' S., but was compelled to return to the coast by the same cause. The next attempt was made in the summer of 1859, under the command of Captain Young, who ascended the river to the latitude of 75° 30' S., but was compelled to return to the coast by the same cause.

The next attempt was made in the summer of 1860, under the command of Captain Young, who ascended the river to the latitude of 80° 30' S., but was compelled to return to the coast by the same cause. The next attempt was made in the summer of 1861, under the command of Captain Young, who ascended the river to the latitude of 85° 30' S., but was compelled to return to the coast by the same cause.

The next attempt was made in the summer of 1862, under the command of Captain Young, who ascended the river to the latitude of 90° 30' S., but was compelled to return to the coast by the same cause. The next attempt was made in the summer of 1863, under the command of Captain Young, who ascended the river to the latitude of 95° 30' S., but was compelled to return to the coast by the same cause.

The next attempt was made in the summer of 1864, under the command of Captain Young, who ascended the river to the latitude of 100° 30' S., but was compelled to return to the coast by the same cause. The next attempt was made in the summer of 1865, under the command of Captain Young, who ascended the river to the latitude of 105° 30' S., but was compelled to return to the coast by the same cause.

The next attempt was made in the summer of 1866, under the command of Captain Young, who ascended the river to the latitude of 110° 30' S., but was compelled to return to the coast by the same cause. The next attempt was made in the summer of 1867, under the command of Captain Young, who ascended the river to the latitude of 115° 30' S., but was compelled to return to the coast by the same cause.

The next attempt was made in the summer of 1868, under the command of Captain Young, who ascended the river to the latitude of 120° 30' S., but was compelled to return to the coast by the same cause. The next attempt was made in the summer of 1869, under the command of Captain Young, who ascended the river to the latitude of 125° 30' S., but was compelled to return to the coast by the same cause.

The next attempt was made in the summer of 1870, under the command of Captain Young, who ascended the river to the latitude of 130° 30' S., but was compelled to return to the coast by the same cause. The next attempt was made in the summer of 1871, under the command of Captain Young, who ascended the river to the latitude of 135° 30' S., but was compelled to return to the coast by the same cause.

The next attempt was made in the summer of 1872, under the command of Captain Young, who ascended the river to the latitude of 140° 30' S., but was compelled to return to the coast by the same cause. The next attempt was made in the summer of 1873, under the command of Captain Young, who ascended the river to the latitude of 145° 30' S., but was compelled to return to the coast by the same cause.

The next attempt was made in the summer of 1874, under the command of Captain Young, who ascended the river to the latitude of 150° 30' S., but was compelled to return to the coast by the same cause. The next attempt was made in the summer of 1875, under the command of Captain Young, who ascended the river to the latitude of 155° 30' S., but was compelled to return to the coast by the same cause.

The next attempt was made in the summer of 1876, under the command of Captain Young, who ascended the river to the latitude of 160° 30' S., but was compelled to return to the coast by the same cause. The next attempt was made in the summer of 1877, under the command of Captain Young, who ascended the river to the latitude of 165° 30' S., but was compelled to return to the coast by the same cause.

The next attempt was made in the summer of 1878, under the command of Captain Young, who ascended the river to the latitude of 170° 30' S., but was compelled to return to the coast by the same cause. The next attempt was made in the summer of 1879, under the command of Captain Young, who ascended the river to the latitude of 175° 30' S., but was compelled to return to the coast by the same cause.

The next attempt was made in the summer of 1880, under the command of Captain Young, who ascended the river to the latitude of 180° 30' S., but was compelled to return to the coast by the same cause. The next attempt was made in the summer of 1881, under the command of Captain Young, who ascended the river to the latitude of 185° 30' S., but was compelled to return to the coast by the same cause.

The next attempt was made in the summer of 1882, under the command of Captain Young, who ascended the river to the latitude of 190° 30' S., but was compelled to return to the coast by the same cause. The next attempt was made in the summer of 1883, under the command of Captain Young, who ascended the river to the latitude of 195° 30' S., but was compelled to return to the coast by the same cause.

The next attempt was made in the summer of 1884, under the command of Captain Young, who ascended the river to the latitude of 200° 30' S., but was compelled to return to the coast by the same cause. The next attempt was made in the summer of 1885, under the command of Captain Young, who ascended the river to the latitude of 205° 30' S., but was compelled to return to the coast by the same cause.

The next attempt was made in the summer of 1886, under the command of Captain Young, who ascended the river to the latitude of 210° 30' S., but was compelled to return to the coast by the same cause. The next attempt was made in the summer of 1887, under the command of Captain Young, who ascended the river to the latitude of 215° 30' S., but was compelled to return to the coast by the same cause.
Anderson have each published a volume giving an account of their travels. We will now give an account of the missionary explorations from the eastern coast, and of the expedition to Central Africa.

The seafaring and enterprising missionaries, Kræf and Rebmann, stationed at Rabiah and Tripoli, in about 1847, began their journeys into the interior of the continent. In that year Mr. Rebmann penetrated westward to Teita, a "country whose mountains rise to such a height out of the vast surrounding plains, that even eminences near Rabiah are to be seen at a distance of 20 miles, and with a magnifying glass you could distinguish the same missionary a journey farther into the interior, to the still more elevated country of Djagg, where, at a distance of rather more than 20 geographical miles from the coast, in a direction about W.N.W. from Tripoli, he made the remarkable discovery of a lofty mountain, named Kilimandjaro, of which the summit is covered with perpetual snow. The existence of snow on Kilimandjaro has been disputed in Europe, though it is difficult to say on what reasonable ground. In subsequent journeys, both Mr. Rebmann and his colleague Dr. Kræf satisfied themselves of the fact; and unless it be intended absolutely to impugn their veracity, their evidence cannot be rejected. In April, 1849, he again set out on his way into the interior, but was prevented by a more considerable indication of the snow during November and December of the same year. Dr. Kræf successfully penetrated as far as Ukambani, a country situated northward of Djagg. Of the geographical results of this journey, one of the most important is the discovery of another snowy mountain, named Kilimanjaro, for Mr. and Mrs. Rebmann. Kilimanjaro. Kénia, is thus described by Dr. Kræf:—"The sky being clear, I got a full sight of the snow mountain... It appeared to be like a gigantic wall, whose summit I observed covered with two immense towers, two horns as you may call them, which were, however, at a considerable distance from each other, give the mountain a grand and majestic appearance, which raised in my mind overwhelming feelings. Kilimandjaro in Djagg has a dome-like summit; but in Kénia above are two cones of the mountain; two horns rise like two mighty pillars, which I have no doubt are seen by the inhabitants of the countries bordering on the northern latitudes of the equator. Still less do I doubt that the volume of water which Kénia issues to the north runs towards the basin of the White Nile." Rebmann's map (Church Missionary Intelligence) Kénia is placed in 1° S. lat., 35° 10' E. long., at a distance of 320 geographical miles north and 55 west from Tripoli. This position, however, can only be considered as a rough approximation, inasmuch as the name of Kræf, in the same latitude, the country of Ukambani and the river Dana, as the upper course of the Orib is called. On this journey the enterprising traveller was subjected to the greatest hardships and sufferings. The climate is so arid, so barren, that fresh discoveries were made in this journey, but some further information was collected respecting the river which flows from the Kénia (Nudukenia or Kirenia) northward, and forms most probably one of the head-waters of the Nile.

The expedition to Northern and Central Africa, conducted by Mr. Richardson, accompanied by Drs. Barth and Overweg, is one of great importance. This expedition originated with Mr. Richardson, who, after having returned from his travels in the northern portion of the Sahara in 1845 and 1846, invited Mr. Dr. Barth, to accompany him in the purpose of concluding commercial treaties with the chiefs of the desert-regions between Tripoli and Lake Chad. Through the lively interest taken in it by Chevalier Bunsen, Baron Humboldt, and Professor Ritter, it was arranged that Dr. Barth and Dr. Overweg, two Germans, should accompany Mr. Richardson for the purpose of making scientific observations. Lord Palmerston sanctioned this proposal, and afforded the two travellers pecuniary assistance, in addition to the knowledge and information obtained through the Geographical Society in Berlin and the King of Prussia.

The three travellers departed from this country at the latter end of 1849, and arrived in Tripoli in the beginning of the following year. Previously to starting from that place, they had been induced to the idea of the two Germans, and surveyed by the two Germans within a radius of 60 to 80 miles from the town, Tripoli. An unexpected degree of cold was experienced in these excursions. On one day the thermometer, before sunrise, stood as low as 60° Fahrenheit, and on the 2nd and 3rd of February, the snow obliged the travellers to remain in their tents. After their return from Tripoli, several were required for their preparations; and the transport of a boat for navigating Lake Chad caused considerable difficulty. For this purpose a beautiful wherry had been constructed by the direction of the admiral at Malta, broad in the beam, and very light on water; but it was necessary to take it to pieces, and several canoes were requisite to convey it across the burning sands of the Sahara.

The travellers started at last on the 24th of March, 1850, the great caravan having departed before them; but the party formed a small caravan of itself, having about 40 camels and men. Every possible assistance was rendered by her Majesty's consuls in Tripoli and Murzuk to the undertakings, so that the expedition started under the most favorable circumstances.

The direction of the route to Murzuk was almost due south from Tripoli, beyond the Gharian defile, the country consisting of a continuous table-land, of an average elevation of 2000 feet. As far as the well of Tobabynia, many deep wells intersect this table-land, and the rains of several Roman monuments and cisterns were discovered by the travellers. Southward of that place is a table-land, or Hamadah, an immense desert of considerably greater elevation, and extending for about 110 geographical miles in the same direction. As far as the eye can reach, neither trees nor buildings are visible; and it is an apparent fact which occurs only is found scattered in the trifling irregularities of the surface. The ground is covered with small stones, pyramids of sand, which, erected with great labour, serve as road-marks to the intrepid camel-drivers by day, while the polar sun has set. On the 24th of February the party travelled six days the expedition reached the southern edge of this table-land, which descends in perpendicular walls to the Wadjel El Has. Following the descent for about 40 geographical miles the travellers came to the Waddi Shikait, a valley, over another plateau of equally dismal aspect. It is composed of a black sandstone, the disintegration of which forms a dark yellow sand, covering the inequalities of the stony surface, from which stands out prominently the black rock, in high, opposite contrast for the bare, yellow desert sandstone and basaltic rocks. They reached Murzuk on the 6th of May, and remained there till the 13th of June, collecting much important information respecting the countries and nations to the south. Murzuk is very unhealthy and dangerous for Europeans and Europeans, but happily none of the party suffered during their stay.

On the 13th of June they set off for Ghat, which they reached on the 18th of July. The most interesting result of this journey was the discovery of several curious sculptures on the rocks of the surrounding country, consisting of two human figures with the heads of birds, and a bull, armed with spears, shields, and arrows, and fighting for a child; the other is a fine herd of oxen going to a watering-place, and another. It is said that the two figures of the travellers the two works bear a striking and unmistakable resemblance to the sculptures of Egypt. They are evidently of much higher antiquity than many other sculptured tablets found by the travellers, on which camels formed generally the principal objects.

The party started from Ghat, after a stay of some days, for the kingdom of Al or Asben. They had to cross a vast desert, totally uninhabited, for about 250 geographical miles, and succeeded in reaching Taghajit, the first inhabited place in this desert.

The route from Ghat to Al or Air is described by Dr. Overweg as a mountain-path leading over ridges, table-lands, and deep-cut rocky valleys. Wherever the wadis become broader, and through the agency of rain are covered with disintegrated sandstone and sand, the most peculiar and scarce vegetation is seen. In this corner of the country the character of the country is here of much greater interest. From Murzuk to Ghat, and farther to the south, the prevailing formation consists of sandstone and sand-stone, through which a coil spring, with all the aspect of the rocks, the same slopes of the mountains and intersections of the valleys, and the same horizontal strata. At Aggeri, about 70 miles to the south of Ghat, the entire scene suddenly changes. The mountains are now rounded, and the Air consists of crystalline primitive rocks, with mica-slate and enormous masses of granite in great diversity of mountain-
forms. From Ghat the general surface of the country continues to rise, and at Selaufet the travellers saw around them the lofty massed walls of their journey of ascent. After the middle of August they experienced the influence of the Soodan rains; the atmosphere then beginning to be humid, and the evenings or mornings being accompanied by fogs. Frequent thunder-storms and heavy rains also occurred at the commencement of the season, when the waters became completely changed, luxuriant plantations of palms being everywhere met with to the south of Taghajit. According to the natives the rainy season lasts till the end of September. At Taghajit, near the frontier of the Upper Benue, Dr. Barth made an excursion difficult and dangerous journey across the Great Desert, believed themselves to be in perfect safety from the attacks of considerable numbers of furious Tuaregics, who had for some time been scattered over the district to murder and plunder them. Between Taghajit and Selaufet, however, at a place about 60 geographical miles farther to the south, on the 25th of August, they were attacked the first time by 40, and the second time by 100 armed men, mounted on camels. By their own courage, however, and the bravery of the Kelowis, their companions, their lives were saved at the expense of a high ransom, and they reached Tintellust, situated 1854, north of the Ungratua, forms. The country around life entirely on the productions of Soodan, in exchange for which they supply Soodan with salt. Every year the Prince Annoor takes the south from 2000 to 3000 camels laden with salt, and returns with slaves and provisions. While the expedition remained at Tintellust, Dr. Barth made a successful journey to Agades, the capital of the kingdom of Air or Asben, which occupied him from the 4th to the 30th of October. Agades, S. 2.] On the 12th of December, 1851, he left Air on their route to Lake Tchad, and arrived at Damergu by the end of December. Here the travellers separated, Mr. Richardson going by the most direct route to Kuka, Dr. Barth southward to Kano, and Dr. Overweg south-west to Maradi and Guber, two states of independent Pagans, where the latter explorer was very kindly received, and obtained much curious information. Kuka, the capital of Bornou, had been fixed as the rendezvous of the travellers, and Drs. Barth and Overweg safely met there again in April, 1851, but Mr. Richardson arrived at the capital to Kano, Kuka a distance of 100 geographical miles W.N.W. from that place, on the 4th of March. The political objects of the expedition deeming now to be the two scientific travellers, Dr. Barth, with Mr. Richardson, was appointed to the south-west of the same as one of the surviving Christians who had come from England to bring presents from her British Majesty. Dr. Overweg also soon arrived. The two travellers were kindly received by the sheikhs and their viziers, and were assisted in all their objects and wishes. Preparations were forthwith made for exploratory tours; and while Dr. Barth was absent on his journey to Adamana, Dr. Overweg put the boat together, and launched it on Lake Tchad. Dr. Overweg embarked, and explored the lake, visiting the Biddunus, who inhabit the islands of which there are about 100 large ones scattered over the lake. On the 29th of May, 1851, Dr. Barth started on his adventurous journey to Adamana, and on the 18th of June reached the great river Benue, which is the native name of the river called on the Tchadda at the confluence of another large river called the Faro. This point of the Benue is about 55 miles higher up than the point reached by Dr. Birket in his voyage in 1854, previously noticed. The Benue is a large river, the average width of its bed running in a general direction from east to west, at the rate of about 32 miles an hour. It is about 800 feet above the level of the sea. The banks are from 20 to 30 feet high. The Benue is separated from the Boko river by a distance of 3 feet deep at the northern part of the Benue. There is a great flood of the Benue inundates the country on both sides. Dr. Barth crossed both the rivers, and proceeded in a south-west direction about forty miles to the town of Yola, which is the capital of Adamana. It is situated in 9° 25' N. lat., 12° 10' E. long., and is a large open place, consisting mostly of conical huts surrounded by spacious courtyards. It is about three miles long from east to west, but does not contain much more than 1000 inhabitants, who are, however, built, and thrash. The town has no industry, and the market is small. The province of Adamana, of which the proper native name is Fumbas, is very fertile, well cultivated, and full of villages. Dr. Barth reached Kuka, on his return, on the 6th of July. On the 11th of September, Dr. Barth set out on an expedition to Kasse, a district on the eastern side of Lake Tchad. On the 18th of September Dr. Overweg joined Dr. Barth on an escort of armed men. They reached Kuka on their return October 14, after having been exposed to much danger from hostile natives. On this expedition Dr. Barth had a favourable opportunity of investigating Lake Tchad. It is a vast lagoon without any means of escape. The current of the river, when moderately full, is about 400 miles, travelling distance, or twenty days journey of about twenty miles a day. It receives only one perennial river, the Shary, which is very large, and in the wet season pours in a large quantity of water. The Shary comes from the south, and enters Lake Tchad at the south end. Another considerable river, the Yeot, or Yow, comes from the west, and enters the lake on the west. The Yow ceases to flow in the dry season. Many of the islands in the lake are permanently inhabited. The swampy parts, in the midst of which numbers of crocodiles and hippopotami, and elephants are very numerous in the vicinity of the eastern side of the lake. On one occasion Dr. Barth saw a herd of elephants proceed- ing along the lake from a distance of five miles, which amounted to ninety-five, and they were walking in a long line, like a regiment of soldiers, the males being in the front, the young ones in the centre, and the females in the rear. On the 25th of November, 1851, Dr. Barth again left Kuka, in order to join a wandering expedition, as far as the town called Mandara. The expedition started on the 6th of December, and on the 30th reached the village of Demmo, when Dr. Barth saw a broad watercourse flowing slowly from east to N.E., shallower than deep enough for canoes, and more than 400 yards in width. The watercourse appears to join the Serbewel, or upper course of the river of Logon, which is the chief affluent of the river Shary. At Demmo a considerable number of females and children were captured. The whole village was destroyed by fire, and made desolate. Slaughtered men, with their limbs severed from their bodies were seen lying about in all directions. The greater part of the men however escaped across the river. There was some fighting, and a few of the Borno army were slain. The expedition continued to the town of Logon. On the 4th of March, 1853, Dr. Barth set out on an expedition to the kingdom of Bagirmi. On the 13th of March he arrived at Logon Birui, capital of the territory of Logon. On the 12th of April he reached the town of Bagirmi, which is situated on the great Benue, and has 400 yards wide. The population of Logon Birui is about 15,000. On the 18th of March he reached the river Shary, 600 yards wide, and was passed over in a large canoe. On the 27th of April he arrived at Massena, the capital of Bagirmi, in 11° 38' N. lat., 16° E. long., and was not allowed to leave the place till the 10th of August. The town of Massena was formerly much larger, and the extent of the wall has been reduced, but is still much too large for the town; and in the utmost state of decay. The town extends over a circumference of about seven miles; but only about half of this area is inhabited, the principal quarter being in the centre, and on the north and west sides of the palace of the Sultan. A deep trough-like depression intersects the town from east to west, which, during the rainy season is filled with water, and in the dry season covered with the richest verdure. The surface within the wall is broken into many other hollows, which contain the wells. On the 6th of July Dr. Barth received dispatches from the Foreign Office of the British government, which were forwarded to him from Kuka, and which authorised him to carry out the objects of the expedition, and supplied him with the means. Lord Palmerston, in his despatch, allowed Dr. Barth the sum of £3000. Dr. Barth determined either to proceed to the eastern coast of Africa, or westwards to Timbuctu. He decided on making the journey to Timbuctu.
The rains had then commenced, and the river was above 1000 yards wide, very deep, and flowing at a rate of about three miles an hour. He crossed the Logusi river on the 14th of August, and arrived at Kuka on the 1st.

On the 20th of September, Mr. Overweg died of an attack of fever. This date closes the 3rd volume of Dr. Barth's Travels and Discoveries in North and Central Africa, 3rd vol. 1853, published by Longmans, Green, & Co., below Shillingford in the 3rd series, 8th vol. on the 28th of November, 1852, and the other volumes, which are to comprise his travels to Timbucto, to resuscitate there, journey back to Kuka, where he arrived December 11, 1854, and his return to England, have not yet (Jan. 1858) been published.

In February, 1853, Dr. Edward Vogel, a young German, employed at Mr. Bishop's Observatory, Regent's Park, Lon- don, was sent to join Drs. Barth and Overweg. He was accompanied by two volunteers from the 3rd series of journeys and missions. They reached Lake Tchad on the 6th of January, 1854, and were received kindly by the sheikh and his wife. Dr. Barth was then absent on his journey to Timbucto. Dr. Vogel is stated to have been put to death by the Sultan of Waday, and his papers have not yet been recovered, nor his fate ascertained with certainty. One of the Sappers and Miners has returned to England; the other, General Maguire, appears to have been assassinated in the course.

Dr. Vogel had sent to England a few notes of his experiences in the course of April, 1856, had crossed the Tchadda at the place where Dr. Balikie had been, in the Pleiad steamer, in 1854.

In January, 1853, accounts were received by the Royal Geographical Society, London, confirming in April, of the successful issue of a commercial journey across the continent of Africa by a Moorish caravan, leaving for ivory and slaves. It had started from Zanzibar on the east coast (9° 6' lat., 20° 9' long.), and had reached a great lake on the west coast, (10° 16' E. long.). The journey occupied six months; a day and a night were occupied in crossing the great lake of Tanganua, also called Passi, Sena, and Maravi. In one part of the journey no inhabitant was seen. The river was well watered.

We now proceed to give an account of Dr. Livingstone's long and hazardous journeys from the interior to the west and east coasts of Africa, the greater part of which were through countries never before seen by any European.

In April, 1852, Dr. Livingstone proceeded to Cape Town, with his wife and children, and sent them home to England. He then returned in order to explore the country in search of a healthy district, which might prove a centre of civilisation, and open up the interior by a path to either the east or west coast of Africa. He was reached Kukan, on his return, by a letter from the chief Sechele that the natives had been attacked at Kolobeng by the Boers of the Cashan Mountains; that the village of Kolobeng had been burned, their goods stolen, and many women and children of the school children carried off for slaves, and his own residence plundered of everything.

Having returned to Kolobeng, and remained a few days with the wretched Bakwains, he proceeded northwards on the 16th of January, 1853. The Bamangwo Hills, between Kolobeng and Lake Ngami, are part of a range called Bakas, which rises about 700 or 800 feet above the plains, and is composed of great masses of black basalt. Its mass of basalt, about six miles long, has tilted up the rocks both on the north and south sides, or about 20 miles beyond the Bamangwo, they found a fine supply of water. This spot was Mr. Gordon Cumming's latest station north. Farther on they came to the hill now 30° 23' S. lat., 24° 13' 60" E. long. It is 300 to 400 feet high, and was the only hill they had seen since leaving the Bamangwo Hills. As they approached Liyani, they found the river-beds filled by the annual inundation, and flowing into the Chobe, which is itself an affluent of the Linyanti. On the 9th of February, 1853, the chief of the Mulolo, named Sekeleti, a young man 25 years of age, married a slave girl named Liyani, numbering 7000 or 9000, received Dr. Livingstone, when they were expecting, with enthusiastic welcome.

The Makolos are the most northerly of the Bechuanas. Having waited a month at Liyani, Dr. Livingstone, attended by a party of the natives, set out from Shebeke,

for the purpose of ascending the Linyanti. Shesheke is about 100 miles east from Linyanti. Linyanti is on the northern bank of the Chobe. The country between the two places is perfectly open, except patchings which are only a foot above the general level. From Shesheke Dr. Livingstone crossed the river Linyanti to Narelie or Nalliele, the capital of the Barotse country, situated in 15° 24' 17" S. lat., 23° 5' 64" E. long. The general course of the Linyanti from the Victoria Falls to Linyanti is 11° 30'; it has procured a sufficient number of canoes, they began to ascend the Linyanti. They had 33 canoes, and about 160 men, Sekeleti and a large party of natives going with them to Narelie. The river, never before seen by European, is magnificent, often more than a mile wide, and with the rapid from three to five miles in length. The banks and islands are richly wooded.

From the bend up to the north, called Katima-Molelo ("I quenched fire"), the bed of the river is rock and sandstone, runs fast, forming a succession of rapids and cataracts, which prevent continuous navigation when the river is low. The rapids are not visible when the river is full, but the cataracts of Namblo, Bomhwe, and Kale, must always be dangerous. The fall at each of these is between four and six feet. But the falls of Gonye present a much more serious obstacle. There they were obliged to take the canoes out of the water, and carry them more than a mile by land. The fall is about thirty feet. The main body of water, which comes over the rocks of rock at the fall, is collected into a space of 70 or 80 yards before it takes the leap, and a mass of rock being thrust forward against the roaring torrent, a loud sound is produced.

The rocks here are those of a red, hard, weathered, sandstone, with madrepore holes in it. This and broad horizontal strata of trap, sometimes 100 miles in extent, and each layer having an inch or so of black silicious matter on it, as if it had flowed there while in a state of fusion, form a great part of the bed of the central valley of the Nile, and the southern part of the country especially, are often covered with 12 or 16 feet of soft calcareous tufa. The banks of the river in this part, viewed from the flat rockly basin in which it flows, presented a feature which it is difficult to portray, 300 or 400 feet high, and stretched away to the N.E. and N.W. until they were 20 or 30 miles apart. The intervening space, nearly 100 miles in length, with the Linyanti winding gently near the middle, is the true Barotse valley. It bears a close resemblance to the western valley of the Nile, and is inundated annually, not by rains, but by the Linyanti, exactly as Lower Egypt is flooded by the Nile.

The villages of the Barotse are built on monads, and during the inundation the whole valley assumes the appearance of a large lake, with grassy monads on which migratory flocks of birds occur in Egypt with the villages of the Egyptians. The Barotse are strongly attached to this fertile valley. They say, "Here hunger is not known." There are no large towns, but here and there are mound buildings, and the mounds being made of mounds of sand artificially constructed. When the river is compressed between the high rocky banks near Gonye, it rises 60 feet. The river presented the same appearance of low banks without trees as it assumed when they came to 16° S. lat. until they arrived at Liboana, 14° 28' S. lat. Twenty miles beyond that there was forest down to the water's edge, and then there were teak. No locality can be inhabited by Europeans where that scourge exists.

Finding that he was near the confines of his territory, the river of Londa or Locti, and having passed it, Dr. Livingstone, and the chiefs of that country being reported to be friendly to strangers, Dr. Livingstone pushed on to latitude 14° 11' 3" S. There the Linyanti assumes the name of Kalombo, and seems to be coming from the east. It is a fine large river, about 200 yards wide. The Lelua is about 250 yards wide, and comes from the N.N.W. The Locti, about 200 yards wide, enters here from the W.N.W. The waters of the Locti are of a light colour, and those of the Lelua a dark mossy hue. The Locti enters the Lelua in a little lowering. The numbers of large game above Liboana are prodigious, and they are remarkably tame: 31 buffaloes defied in slow procession before their fire one evening, within gun-shot; and herds of antelopes and hartebeests, 2000 yards distance. The lions were in great numbers, as is always the case in Africa where game abounds. A party of Arabs from Zanzibar were in the vicinity at this time. After remaining some days in this country, Dr. Livingstone returned to Linyanti, and made preparations for his journey of
to Loanda, on the west coast of Africa, as soon as the cooling influence of the rains should be felt in November.

He had few scientific instruments, but they were of the best kind—a sextant by Troughton, a chronometer by Dent, a thermometer by Doll, a compass from the Cape Observatory, and a small telescope.

On the 11th of November, 1833, he left the town of Linyanti, accompanied by Sekelute and his principal men, to embark on the Chobe. They crossed five branches. When on the banks of the river they took up their deep race small boats. The banks are of soft calcareous tufs, like those of the Zongas. The bed is deep, and the sides perpendicular. The course is extremely tortuous.

The distance of the Chobe from the Leebame is undefined, on account of each dividing into several branches before they unite, but when the whole body of water collects into one bed, it is very wide, and is a goodly sight for one who has spent many years in the thirty south. Turning round they began to ascend the Leebame, and on the 19th of November reached the village of Shesheke. After a short stay they proceeded up the Leebame. Their progress was slow, owing to their waiting at the different villages for food.

This journey to the west coast, was accompanied by a band of 27 men, belonging to the Makololo. It was the dry season. Parts of the river were only about 200 yards wide, and very deep. In other parts it is spread out to more than a mile, and the water flows rapidly over the beds of rock which require great care to manage the canoes in these shallow parts. The rapids are caused by rocks of dark-brown trap, or of sandstone stretching across the stream. In some places they form miles of the rocky bottom, with illets covered with trees. Leembate is the last town of the Makololo, and is situated on a mound like the rest of the villages in the Barotse valley.

On the 27th of December, 1833, they were at the confluence of the Leebame and Leebame, 14° 10' 52" S. lat., 23° 20' 10" E. long. From the confluence down to 27° south there are many long reaches where a vessel equal to the Thames steamers plying between the bridges could run as freely as they do on the Thames. It is often, even here, as broad as that river at London Bridge, and perhaps as deep. They have also wood and some birds of passage to a continued navigation for hundreds of miles at a stretch. About ten miles below the confluence of the Loeti, for instance, there are many large sand-banks in the stream; then there are a hundred miles to the river at Simath, where a Thames steamer could ply at all times of the year; but again, the space between Simath and Katima-Molelo has five or six rapids, with cataracts, one of which, Gonye, could not be passed at any time without portage. Between these rapids the river is narrow and deep, and the descent of several miles is at once a vertical fall. Beyond Katima-Molelo to the confluence of the Chobe there are nearly 100 miles again of a river capable of being navigated in the same way as in the Barotse valley.

The river rides down the Leebame. The water is dark in colour as compared with the Leebame, which here assumes the name of Kabombo. The Leebame flows placidly, and, unlike the main river, receives numbers of little rivulets from both sides. It winds slowly through the most luxuriant meadows, each of which has a soft sedgy centre, or a large pond, or else a gentle riff flowing down the middle. The meadows are probably inundated, as the trees are on spots elevated three or four feet above the meadows. The rains were now set in, and the travellers were much drenched.

When they had descended something more than one-third of the Leebame, they left the river, and travelled overland on the eastern side by the village of the chief Shinte, till they came to the Lake Dilolo. On their route they crossed several affluents of the Leebame, and travelled over extensive plains, much of which was under water.

On the 20th of February, 1834, they reached the small end of the Lake Dilolo. Dr. Livingstone, being exhausted by fever and abstinence, could not visit the wider end. After passing a branch of the N.W. coast of the lake, which flowed northwards into the fine river Kasai, or Lokë, which has a northern course, while all the rivers they had previously passed flowed south wards; thus showing that the flow is parallel in which the Lake Dilolo stands an elevated flat which forms the confluence of the streams that flow to the north and south respectively.

On the 4th of April they reached the banks of the Quango (Coango), a river 160 yards wide, and very deep. This fine river flows among extensive meadows clothed with gigantic grass and reeds, in a direction nearly north. They crossed it after a dangerous contention with the natives, and passed on westwards to the village of Cassange (pronounced Cais- cange), which is the farthest station eastward of the Portuguese. They were now safe, and in the kingdom of Angola. Cassange is situated in 9° 37' 30" S. lat., 17° 49' E. long. The distance to Loanda is about 300 miles. On the 14th of May they reached the village of Quango Alto and Cassange on the N.E. coast of Angola, or rather May, arrived at Loanda. St. Paul de Loanda has been a very considerable city, but is now in a state of decay. It contains about 12,000 inhabitants, most of whom are people of colour. It possesses two colleges, one of which, formerly a Jesuits' college, is now a workshop. The forts are in a good state of repair. The Portuguese bishop of Angola resides at Loanda, and was very kind to Dr. Livingstone. The harbour is formed by a low sandy island, between which and the mainland is the station for ships. There was not a single English merchant there, and only two American merchants. Mr. Gabriel, the British commissioner for the suppression of the slave-trade, treated Dr. Livingstone with great kindness and hospitality.

On the 20th of September, 1844, Dr. Livingstone and his party were on the coast, separated from their servant by the river Quango, and on the next day proceeded into the territory of Linyanti. They passed round to the mouth of the river Bengo, and ascending that river, arrived at Icollo Bengo, and on the 28th of September at Kalamungwo, on the same path by which they came. The Bengo is also cultivated. Dr. Livingstone proceeded in a canoe down the river Lucalla to Massangano. The river is about 85 yards wide, and navigable for canoes from its confluence with the Coanza to about six miles above the mouth of the Bengo. It is situated in the midst of a group of curious columnar-shaped rocks, each of which is upwards of 300 feet in height. They are composed of conglomerate in a matrix of dark red sandstone, and rest on a thick stratum of this sandstone, with very few of the peculiar figures of the Coanza. The extent of the Coanza reach is reported to be thirty leagues below Pungo Adongo.

On the 1st of January, 1845, they departed from Pungo Adongo. Their path lay along the right bank of the Cassange. On reaching the confluence of the Lembe, Dr. Livingstone left the river, and proceeded in a north-easterly direction. Passing over the heights of Tala Mengongo, 9° 45' 37" S. lat., 17° 27' E. long. (Jan. 15), they arrived again at Cassange.

On the 28th of January they crossed the Quango in canoes. Having reached the eastern side of the river, they ascended the eastern activity which bounds the Cassange valley, and found it to be 6000 feet above the level of the sea, the bottom of the valley being 3500 feet. They crossed the Lombe, which is more than one-third of the height of London on the west. On the 25th of March they crossed the Chikapa, and then the Kamane, an affluent of the Chikapa, coming from the S.S.W. On the 30th of April they reached the Bongonde, where they had to ford a ridge to cross.

On the 7th of May they arrived at the Moseango, a stream 30 yards wide, which they crossed by canoes, and arrived at Cabango, a village on the banks of the Chilombo, in 9° 31' S. lat., 20° 31' E. long.

On the 18th of May they came to the main village of Bango, and on the 28th reached the village of the chief Bango, 12° 29' 53" S. lat., 20° 58' E. long. On the 30th of May they left the village of Bango, and proceeded to the river Loembwe, which flows to the N.N.E., 50 yards wide, and 4 feet deep. Hence they reached the village of Kawama, who wished to detain them, but being one of his hidden canoes by night, they crossed to the southern bank of the river Kasai.
After leaving the Kasai they entered upon the extensive level plains which they had formerly found flooded. On the 12th of June they found the Lotembwa, there about a mile wide and very deep, and regained their former path. It is a N.W. of Lake Dilolo, and seems to flow from it northwards, and enter the Kasai, whilst another river Lotembwa flows from the other end of the lake southwards. Thus, this little Lake Dilolo, by giving a portion of its contents to the Kasai, the latter is that of its tributary its waters to the Atlantic and Indian Oceans. From these elevated plains all the rivers seem to unite in two main drains, the one flowing to the north, and the other to the south. The northern drain, the Kasai, flows eastwards and joins the southern by the Zambesi to the east. Dr. Livingstone was thus on the watershed, or highest part, of those two great river-systems, but still not more than 4000 feet above the level of the sea, and 1000 feet lower than the top of the southern ridge they had already crossed. Instead of lofty snow-clad mountains appearing to verify the conjectures of the speculative, there were extensive plains, over which a person may travel a month without seeing anything higher than an ant-hill or a tree.

Sir Roderick Murchison, in his Address, as President, to the Royal Geographical Society, in 1852, explains the peculiar geological structure of the African continent. "Such as South Africa is now, such have been her main features during countless ages, and have been modified by the movement of the great continents. For the old rocks which form her outer fringes unnotionably circled round an interior marshy or lacustrine country, in which the dicyonod flourished, at a time when not a single animal was similar to any living thing which now subsists, and then progressive, the central and meridian zone of waters, whether lakes or marshes, extending from Lake Chad to Lake Ngami, with hippopotami on their banks, are therefore the great modern residual geographical phenomena of those of a mammalian age. The differences, however, between the geographical past of Africa, and her present state are enormous. Since that primeval time the lands have been much elevated above the sea-level, 

Dr. Livingstone having resolved to make a journey to the east coast of Africa, two routes offered themselves, one in a direction N.E. by the town of Cazembe and the southern end of the Lake Tanganyika to Zanzibar; the other nearly east by the course of the Zambesi. He chose the latter. On the 31st of December, 1855, he left Linyanti early in the morning. Dr. Livingstone having resolved to take a journey to the east coast of Africa, two routes offered themselves, one in a direction N.E. by the town of Cazembe and the southern end of the Lake Tanganyika to Zanzibar; the other nearly east by the course of the Zambesi. He chose the latter.
passed their route numerous villages inhabited by the Batoka. On the 18th of December they reached the bank of the Kafue, a river upwards of 200 yards wide, and full of islands. From there on the 25th, they arrived at the Zambesi, in order to form an establishment in a healthy locality, and to enter into friendly commercial relations with the natives. He will be supported by the British government, and his project has received the sanction of the King of Portugal. A middle passage has been provided, and he will be accompanied by three or four scientific gentlemen, who will assist him in his well-intentioned labours.

In 1854, Lieutenant Burton of the army of the East India Company, on a hazardous journey to Mecca and Medina, performed a short but still more perilous journey to Harar in the Somali peninsula, of which he has given an account in his 'First Footsteps in Eastern Africa.' Though at no great distance from the town, he finds its elevation of 2500 feet, and the sea gives to this country a comparatively temperate climate. Fortified sufficiently to repel the incursions of the surrounding savage tribes, and under the rule of a young and very arbitrary sultan, Harar enjoys the eminence of a considerable traffic in choice produce, more particularly coffee. [HARAH, S. 2.] Lieutenant Burton has since undertaken a journey from the eastern coast of Africa in the direction of the Lake Nyasi, yet unvisited by Europeans, and may possibly reach it in 1858; but the question which has excited the curiosity of the learned world from the time of Herodotus to the present day.

AGADES, or, as the Turcics call it, £kade, is a town of Africa, situated in 19° 23' N. lat., 7° 30' E. long., on a large river called the Zambesi, the capital of the kingdom of Air or Asban, with which we have recently become acquainted through the travels of Dr. Barth, who visited Agades in 1850. No author is known who has mentioned this place before Leo Africanus, in whose time it was a flourishing town. Agades from its situation, must always have formed an important central place between the Kelowas and the tribes inhabiting the districts to the south and west. There are traditions among the inhabitants of the period of the Greek occupation of its originating from the north, probably belonging to the Berber race. There is, no doubt, a good deal of slave blood among the present inhabitants of Agades, as is the case with the whole population of the south-eastern portion of Air; but there must have been a very ancient stock of indigenous black people, who have transmitted a peculiar language of their own, which is the same language as that spoken by the people of Timbucto.

Agades is now contained not less than from 50,000 to 60,000 inhabitants. Dr. Barth was assured by the Turcics, one of whom had been at Timbucto seven times, that it was much larger than that place. At present the appearance of the town is that of an almost ruined place, scarcely the sixth part of the houses remain, and about 700 houses only. The number of the inhabitants is estimated to be from 7000 to 8000, who are partly merchants and partly artisans. The merchants seem to visit only the markets of Katsena, Tasawa, Marado, Kano, and Saccota, and do not go to the northern markets of Ghat or Murunk, unless on a journey to Mecca. There exists no intercourse with Timbucto. The commerce of Agades itself is principally in millet, which constitutes the principal food of the inhabitants. The manufactures are very limited, consisting mostly in cloth-work and mats. The saddles made in Agades, particularly those used in riding upon the mohers, or swift camels, and also the sandals, are far famed.

Sailing down the branch of the river on which Kiliman stands, they reached that village, it being then May 20, 1856, only a few days less than four years since Dr. Livingstone started from the Cape. Kiliman is in 17° 55' 8' S. lat., 36° 40' E. long. The village stands on a great mud-bank, and is surrounded by extensive swamps and rice-grounds. Dr. Livingstone waited there about six weeks, when he Majesty's brig 'Agnes' arrived, and went, and there is a dangerous bar at the mouth of the Kiliman branch.

Dr. Livingstone left Kiliman, July 12, 1856, and arrived at Mauritius, August 12. He returned by the Red Sea and the Overland route, and arrived in England on the 12th December, 1856.

The preceding sketch of Dr. Livingstone's arduous journeys is taken from his interesting volume, 'Missionary Travels and Researches in South Africa, including a Sketch of Six Years' Residence in the Interior of Africa, and a Journey from the Cape of Good Hope to Loanda on the west coast; thence across the continent down the river Zambesi to the Eastern Ocean,' Svo. 1857.
AGD

water near the town, and there is also plenty of brushwood.

AGDE. [HEBRUART.] AGNES. [SOMERSET.] AGNER. [CORNWALL.]

AGRICULTURAL IMPLEMENTS. Few of the pro-
ductive arts have made more rapid progress within the last
few years than those relating to the cultivation of the soil.
In the application of chemical terms and in the develop-
ment of practical science to implement-making, this advance has
been equally observable. When the corn-

laws were repealed, and agriculturists were deprived of the
support—or, perhaps it would be more correct to say,
refused of the protection—without which the progress of
energy was thrown into those two departments of industry.
As a consequence, greater improvements have been developed
in twelve years, than in twice or thrice that space of time
under the old order of things.

When the jurors prepared their report on the Agricul-
tural Implements displayed at the Great Exhibition in
Hyde Park in 1851, they grouped them all under certain
headings, according to the kind of service they were intended
to render in field and farm; such as Instrument of
Tillage—Implements used in the Cultivation of Crops;
Harvesting Implements; Preparations for Market; Machines
for Preparing the Food of Stock; and Draining. Such
will also be a convenient mode of grouping to adopt here.

Instruments of Tillage.

Ploughs.—Until about the year 1840, four-horse ploughs
were still used in many parts of England; notwithstanding
that in the very same parishes ploughs with two horses
had been tried for a considerable time. The second
plough had been adopted for clay soils, when such formed
the chief corn-lands throughout the island; but they
were not suitable for an altered state of agriculture, when
the rotation of crops was adopted and the grass
became corn-lands. Even when the swing-plough was
invented as an improvement on the old wheel and gallow
plough, the weight of draught was little less than before.
It was the Messrs. Ransome of Iewish who furnished the
modern improvement and introduced forms of mould-
boards adapted to different soils. Messrs. Howard and Mr.
Busby afterwards paid particular attention to the curvatures
of the mould-board; for this is indeed the essential act-
ing part of a plough; raising, turning-out, and throwing over
every furrow-well of earth in true parallelism with other
slices. Foreign agriculturists have often expressed
surprise at the length of the mould-boards in modern
English ploughs; since it is seen that short boards are
better adapted to raise the soil while they turn it over; it
has been found, however, by experience, that clay lands
require longer mould-boards than those which are drier
and lighter; and hence a plough suitable in England might not
be so advantageous in Scotland, or on the continent.
Among the various varieties of ploughs exhibited at the
trial at Mr. Pusey's estate in Wilthorpe, by Mr. Miles,
Mr. Shelley, and Mr. Owwithead; while eleven others were tried
at Mr. Mech's farm in Essex, by Baron Mortens D'Osten,
Colonel Challoner, and Mr. Johnson. Of the former group,
six were two-wheel, three one-wheel, and six swing-
ploughs. Some were found best at a seven-inch furrow;
some broke the land too much in a furrow of that depth.
All the swing-ploughs were clearly ascertained to be inferior
to those with two wheels. It was further found that a
particular curvature of mould-board suitable for a five-inch
furrow worked unsatisfactorily in one of seven inches—
showing, as many an old farmer would be astonished to hear,
that there are mathematics even in farming. The Royal
Agricul-
tural Society had in recent years recommended the use of
ploughs for two distinct purposes—the ordinary plough,
and a deeper ploughing once in four years, when the
root-
crop recur, to give the land more thorough stirring. A
common plough is fitted with a sickle scythe, but Mr. Meall
and other makers have constructed powerful ploughs, to
be worked at leisure in winter with four or six horses.
Mr. Fisher Hobbs, in reporting on the ploughs exhibited at
Culthie Agricultural Show in 1850, said that enough had been
invented to plant the land, and dig another, but it was
now introduced in recent years, in nearly all parts of the
English plough. Eleven ploughs were tried on a strong loamy soil, with
a considerable quantity of herbage upon it. The Cumberland
swingle-ploughs were found decidedly inferior in power and
efficiency to ploughs with iron wheels, made by Ransome,
Howard, and other celebrated manufacturers; these latter,
averaging about 90s. in price, were pronounced to be among
the best ever produced. A machine for deep ploughing, by
Methus. Ransome, was two feet deep, and whose plough
and as well laid as any produced at shallower depths.
Some persons have expressed an opinion that the plough has
now reached the highest point of perfection; but Mr. Fisher Hobbs
remarked with praiseworthy caution, "I still look forward to
the day when the plough will be adapted to the present operations on
the soil, and for leaving the land in a fit state for drills or other machines required
to complete its cultivation.

Harrows.—The harrow was always made with square
bars and square-set teeth; but as it was difficult to make
such a harrow work equally in different tracks, even though
dragged from the corners, modern makers have constructed
harrow which have the teeth set cross-wise, enabling the
harrow themselves to be-chime against each other's
expanding harrow is a very complete implement. The
bars at every point of crossing are united by a loose pin,
on which they work freely; the width of the harrow can
thereby be increased or diminished; the tines, according to
the state of the land, can be brought nearer together or
spread wider apart; and there are small wheels, easily let
down, by which the harrow can readily be moved from one
field to another, without disturbing its general mechanism.

Rollers.—The late Mr. Pusey, one of the most enlightened encouragers of scientific
agriculture, "the landlord was often asked by his tenant for
some old tree to convert into a roller; the tree roller, when
manufactured, had its framework loaded with rough mate-
els, but it soon turned black and could never become
in a year a most unignis instrument." Iron rollers of excellent construction have since been introduced.
Their regularity of surface has, however one disadvantage, in
pressing over small cloaks so smoothly as to make the
soils, and not to grind them. Mr. Class, of Belgium, has invented
a roller, intended for narrow round ridges, but also fitted to
produce the action just adverted to; it consists of four rings or
partial rollers, so adjusted on one axis as to have independ-
ent motions, and to produce a mass of loose particles
the soil have, however, been nearly superseded
by

Clod Crushers.—This apparatus, invented by Crosskill,
is used chiefly for breaking down turnip land which has been fed
off by sheep in wet weather and afterwards backed by the sun;
it is also a good presser for green-maize; and is made
on or to grind them. The架ged iron teeth form the chief
characteristic of this implement. Mr. Gibson has since in-
volved the jointed or crosswise, produced the favourite
rows of very narrow wheels, alternating one with another.
Each of these kinds of clod-crushers has some advantages
over the other. A third variety, of later introduction, is
known as the 'Self-Cleaning Clod-Crusher.' It contains a
series of eccentric wheels upon an axis, which, in revolving, rub
and clean each other.

Scorifiers, Grubbers, and Cultivators.—The implements
denoted by these several names are intended to save a great
part of the time spent in ploughing on the old method.
in an ordinary four-course system of arable culture, the land
receives seven or eight ploughings in the four years; but
if a scorifier is employed to parcel the surface to a depth of two
inches immediately after the wheat harvest, much of the
four years' labour will be economised. From this time
there may be likely to many ploughs set abreast, so as to cut up
and turn over a slice of soil five, six, or seven feet in width. Not
only is the time spent in ploughing lessened, but less sub-
sequent employment of the harrow and the roller is needed.
Many forms of these time-saving implements have been in-
vited. Coleman's scorifier, with six horses, is adapted for
very hard ground. Biddle's, made by Messrs. Ransome,
is suitable for going deeper into looser ground. Kilby's and
Bentall's ploughs, this latter patented in 1846, are used for
ordinary ploughs and scorifiers, and are useful for a very
close surface of land. Cotgreave's plough is a cultivator, in
which these processes are combined in rather a curious way;
it first ploughs and turns a furrow five inches in depth; then
rolls the ground over, and afterwards works the harrow over
it on the top of the first; and lastly, a sub-pulveriser
loosens the soil to a further depth of 3 or 4 inches. Beau-
clerk's patent plough and subsoiler may be likened to a
common plough with an Archimedian screw attached, which
revolves in the bottom of the furrow, thus ploughing and

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superseding at the same time. Such farmers as have duly provided themselves with some or other of these various instruments, may learn to cultivate seven or eight to two or three in the four years. In 1851 Mr. Pusey said:—"I will venture to add, what may appear theoretical, that if every steam be employed successfully in cultivating the field, why be less by ploughs or digging than with an implement like one of these cultivators; because they are able to work so much wider a space as they pass along in their course." Some of these implements have shares, some points, to dig into and turn up the soil. Several have been made to introduce steam-cultivators. One, exhibited by Mr. Usher in 1855, consists of a steam-engine moving itself by the revolution of a large circular roller placed under it; and to it are attached numerous ordinary plough-shares reversed, revolving behind the engine. Another, also made by Mr. Fitch, consists of two ordinary ploughs fixed to a carriage or framework of iron, and moved by an endless rope communicating with a steam-engine fixed in one corner of the field. Others have since been brought forward; but this department of the art is confessedly in its infancy.

Implements used in the Cultivation of Crops.

Drills.—The drill has almost driven the hand-sower from English farms. One half of the horse-power formerly expended in harrowing is saved by the adoption of some of the modern drills or sowing-machines; a saving of seed is also effected; and there is also an avoidance of the necessity of borrowing into the same ground at a particular angle, which was formerly deemed necessary as a preliminary to hand-sowing. The drill, in fact, is the key to a whole system of husbandry; for, in addition to the advantages just enumerated, the drill is applicable to the use of many artificial manures, many sowing them beneath the ground, special coulters, and covering them with earth, that their excessive strength may not injure the seed, which is deposited last of all; while the use of the horse-hoe is almost wholly dependent on the previous use of the drill. Drills of recent invention exhibit much variety and ingenuity of construction. Some are for general purposes, capable of drilling with or without manure, wheat, beans, and turnips, at the different intervals suited to those seeds respectively, from seven inches up to two feet. Some are turnip drills, in which manure, generally ground bones, or superphosphate, is distributed as well as seed. Some, for use in unusually dry weather, pour down each manure-coultar the requisite amount of water mixed with powdered manure. Some, to economize in the manure, close the seed and the manure only at those spots in the lines or rows where the plants are intended to stand without molestation from the hoe; each machine having a power of adjustment to different widths or different numbers of seed-rows. Some, the wellcelebrated machines of Messrs. Garrett, have contributed to the excellence of the modern drills. Messrs. Garrett have improved the wheeling or moving power of the general-purpose drill, to the ease of the horse and the driver; the turnip drill they have greatly improved; and they have constructed a hand-barrow drill for distributing grass-seed broadcast in a very effective manner. Messrs. Horse-bay have constructed a drill for depositing manure-dust and turnip-seed on ridges, and reducing the ridge by concave rollers to a compact rounded form; they have also introduced India-rubber tubes for conducting the seed down to the channel made by the coultar, instead of using a series of tin cops; and they have also done much to enable the drill to deposit seed and manure on hill-sides, and to work equally well on ridges and on the flat. "The smaller drills have invented a steartage corn-drill," adapted for being driven with great nicety, and for delivering the seed equally well going up or down hill. One of the drills lately invented is especially contrived for distributing equally well liquid manure or the solid manures. In short, the drill is now an implement to which all the makers devote some sedulous attention.

Top-Dressers or Manure-Distributors.—Although wheat is sown by the hand-sower, the manure is usually provided with its requisite nitrogen by farm-yard dung or by sheep-folding, yet it generally requires a top-dressing of manure during its growth. This need to be applied by hand; but several machines, of which one is by Mr. Holmes, have since been invented to perform this service. It distributes three or four bushels per acre of guano or nitrate of soda, or a larger proportion of rape-cake or superphosphate, on wheat in the spring of the year. The machines are much more simple than drills.
by Crosskill; one of M'Cormick's improved by Lord Kinm;
under, another of the same inventor, improved by Burgess
and Key; and one of Hussey's, improved by Messrs. Dray;
and one of it was adopted by Palmer. The prices ranged
from 25L. to 42L. That was the first of them. The other
and again on Mr. Miles's estate at Leigh Com-
in three fields exhibiting striking contrasts. The machines were
worked from morning till night—each in cutting both wheat
and oats, and the cord-cutting, another in threshing, and
there was a constant exhibit of steam powerful enough to
barns by fixed engines, it is perfectly feasible in the open
air by a locomotive engine—a plain, healthier and more
expedient for the laborer, and rendering probable a
considerable saving of farm buildings requiring to be
constructed by the landlord. The Agricultural Society gave
the first impetus to the construction of move-
able steam-engines for farm purposes; and the annual prizes
and exhibitions have been very influential in determining
the interest of the farmers to adopt the improvements. For
example, in the year 1851, there were engines of this kind exhibited, made
by Horseby, Tuxford, Clayton, Barrett, Hensman, Bullin,
Roe, Ransome, Garrett, and other makers. Every one felt
that the invention was still in its infancy; for the worst
specimen exhibited consumed three times more coal than the
best. Of thirteen specimens examined, the nominal horse-
power varied from 4 to 9; the time of getting up steam,
20 to 83 minutes; the coal used in getting up steam,
10 lb. to 75 lb.; the steam used, 6'79 lb. to 25'80 lb. Mr. Locke,
reporting on these trials, said, "If I might be permitted to
suggest a little advice to the makers of these engines, I
would beg of them to attend more to the proportions of
the whole ; for I am quite convinced that the want of
success is a want of good proportion in several of the engines; and
this to a mechanic or an economical farmer, is of more
importance than a profusion of brass."

At the Carlisle Agricultural Meeting in 1855, a manifest
improvement in the expense of the engines can be noticed.
The maximum consumption of coal per horse-power per hour
was 10 lb.; while the minimum (in Messrs. Tuxford's engine)
was only 3'7 lb. It was, however, considered by some of the judges that this element of merit had been somewhat
asked with prejudice, and that a certain competition laid down by the Society for portable engines
have unfortunately led to the production of engines only
intended for winning the Society's prizes, and known as
"racing engines," required the nicest care; instead of these
simple and effective engines which may be safely entrusted
to the management of intelligent farm-servants; " and it
was recommended in future " to submit the prizes engines to
subsequent trials, for a prolonged period, under the
ordinary management of a farm establishment."

At the Salisbury Agricultural Meeting in 1857, there were no fewer
than twenty exhibitors of agricultural steam-engines; of
which one firm, that of Messrs. Clayton & Shuttleworth,
made at the rate of 600 engines per annum. In some of the
engines exhibited, the drivers are two men. However, an intelligent farm-labourer, may be seen driving the barn
machinery, cutting chaff or roots, crushing oats, grinding
corn, polishing mangold-wurzel, splitting beans, sawing wood,
pumping water, and lending its boiler for steaming potatoes
or rice.

**Threshing-Machines.**—Threshing-machines worked by
horses were considered, in their day, a vast improvement
over the flail of earlier times; and so they unquestionably
were. It occurred to Mr. Amos, the agricultural engineer, how-
ever, that a large amount of power was wasted in dragging
dead weight; and he found on experimenting in 1849, much to
the astonishment of farmers, that in a four-horse machine the
strength of three horses was expended in moving the wood
and in the beat of walking, and only one horse was really
available in threshing the corn. The makers immediately began
to reform their methods of construction; and they gradually
succeeded in bringing down the friction and dead weight
to two and a-half, two, one and a-half, and even one horse out
of four. At that point, however, the higher class of farmers
began to think more of steam-threshing than horse-threshing.
In the one case, as in the other, the threshing arms or levers
begin their work as soon as a central axis or shaft is set in
motion; whereas the horse is only begun to work half a minute
after the machine is set in motion. Several threshing-machines were tested by the
Exhibition Jury in 1851; they differed greatly in excellence;
bio not on an average they required fifteen-horse power to
thresh two and a-half cwt. of wheat sheaves per minute, or
nineteen-horse power for barley. The engine and machinery
that those which worked with least horse-power were not
necessarily the best in the quality of work done, as denoted by
the three tests of excellence—clean threshing, unbroken
preparation, and grind.
grain, and uninjured straw. Malsters continued up to that year to distrust machine-threshed malting barley, on the ground that it was often too much bruised and injured for germinating. The makers had therefore every reason to try and improve these threshers. It was calculated that wheat is usually threshed for about 3s. 6d. per quarter, all expenses included; whereas steam threshing cost less than 1s.; and that, therefore, to make the new, the old steam threshing would be unquestionable. By the year 1855 the improvement in the machines was most decided. There were several exhibited in that year at Carlisle, of about eight-horse power, which threshed about 200 sheaves in twenty minutes. The judges, in reporting on the trials, said, "These machines are now become of material importance, inasmuch as they enable the farmer in so short a time to prepare the corn for market. They have, in fact, almost entirely superseded the flail; and without their powerful aid the full supplies of corn could not this autumn have been furnished for consumption. The extraordinary demand for the threshing machine, and its daily use on the farms, are circumstances that prove its estimation by the agricultural community." A fixed steam-engine, working systematical barn-machinery, threshes corn more economically and effectively than portable machines; but the latter are of great importance in so far as they can be let out by their owners to different farmers to be employed according to the exigencies of the harvest. No kind of agricultural machine has met with more opposition from hand-labourers than threshing-machines; but the prejudice in favour of the old and inefficient way is dying out in this as in other directions. It is said that in 1845 a muster of 1000 was held at Salisbury in 1830 for firing barns containing machinery; whereas in the same town in 1857 the labourers cheered loudly on witnessing the success of the reaping machine.1

Winnowing-Machines.—Instead of threshing the threshed corn to the wind, as in the old process, it is now winnowed by very ingenious and intricate machinery. Messrs. Hornsby were among the first to achieve success in the construction of such machines. Their winnowing apparatus is fitted with a spike to receive corn by a gently converging sort of hopper; it separates the corn from the chaff in the rough pulpy state, as it comes from the threshing machine, without being previously riddled; and it can be adjusted to suit corn either in rough chaff or in any other state. The meshes of the grating are so varied, and placed in such relative positions, that the winnowing-machine will separate the whole produce of the threshing-machine into 'best corn,' 'good tallings,' 'tallings,' 'whites,' 'screenings,' and 'chaff,' at the rate of fifty bushels and directed to the chaff, at the rate of twenty quarts per hour. Not only has the flail been nearly superseded by the threshing machine, and horse-power by steam-power, but the threshing-machine itself, instead of being a mere box for beating out the corn in a rough way, has of late years been improved and adapted in order to combine the threshing and winnowing machines in one, beating the grain from the ears, and then cleaning and separating it ready for market.

Machines for Preparing the Food of Stock.

Turnip-Cutters.—Formerly farming stock was fed with hay, or turned out to pick over straw, occasionally mixed with turnips; but scientific and practical men aided each other by degrees in discovering that this labour of the jaws wasted the muscle of the animals, and retarded their progress. Hence the invention of many ingenious machines for facilitating the preparation of food for live stock. One of these is the turnip-cutter or cutter, in which small pieces one important variety of this food. Some farmers have asserted that lambs fed with machine-cut turnips are at the end of a winter worth 5s. per head more than other lambs which have wasted their muscle in masticating whole turnips; and assuming this to be true, it has been calculated that, allowing for wear and tear and labour in using the machine, the improvement is equivalent to a saving of 70s. per acre upon turnip crops. These estimates are frequently disputed in detail; but there is no doubt that the saving is a real one, and that its amount may be at least 50s. per acre. The act by sharp-edged instruments, working horizontally or vertically according to the nature of the machine adopted. Some of them cut turnips for cattle-food; some for sheep, according to the nature of the machine.

Chaff-Cutters.—The cutting of straw into very small pieces, to supply the deficiency in natural chaff for cattle-food, was at first done by hand, with a sort of knife hinged at one end; then by a series of knives working round an axis, the old pieces of straw being shaken off; then by a fixed or movable steam-engine on a farm. The process now costs only one-sixth or one-eighth of the charge formerly incurred. The machine is useful even to cut hay itself as a means of facilitating the masticatory process. In this machine, if necessary, the 'hopper' is in, by which the straw is conveyed to the machine, thence by a conveyer to the hopper, and it is then cut by the machine, and the cutting machine is separated therein. Corns cut 14S. lbs. of chaff per hour, by steam-power, those that worked by the muscular power of one man each cut quantities varying from 90 to 310 lbs. per hour.

Coma.—By the year 1855, a large number of modern improvements, both by the crushing movement of rollers rather than the grinding movement of mills, and are intended to facilitate the commination of substances for cattle-food. One is a lined seed-crusher; another a corn-crusher; the third an oil-cake bruising mill; the fourth a fine-mash mill; a fifth a coarse bruise. It is evident, from a mere inspection of this list, that there is much scope for ingenuity in the arrangement of working parts for such machines. Some of the fine-mash mills, made principally for barley, beans, and oats, admit of adjustment which will enable them to grind anything from lined up to flint-stones." Messrs. Hornsby, Garrett, Crosskill, and other manufacturers, now make steam-worked oil-cake breakers that will break 3000 lbs. of oil-cake and make fine meal at one operation.

Pulping-Machines.—Farmers are not agreed concerning the amount of advantage derivable from the reduction of root-food to a softened state. In reference to potatoes, it has been found worth while to steam potatoes for pig food; and in another case, and for the use of cattle, such as turnips, which, being thus treated, may be rendered good victuals to be stored up for months. The pulping of turnips enables the root to be incorporated with other nutritious articles of food; but on the other hand, there is a tendency to cause a partial or total, or sufficiency, of the liquid from the solid portion, and then much of the saccharine qualities is lost in the liquid. The turnip pulping machines, which are both hand-worked and steam-worked, are on this account less decidedly successful than most modern agricultural implements.

Draining.

Tile-Machines.—There is much land that does not require more draining than the farmer can easily effect in the course of his yearly operations; but where a landlord systematically drains his poor land to increase the rental obtainable for it, his operations require to be conducted on a considerable scale; and then it becomes an important matter with him to have his tile-machines working every second or third day. Tile-draughting, is, on his own estate, with clay dug close at hand? To answer this question has been a matter to which a large amount of ingenuity has been applied. Until about the year 1840, draining tiles were made by hand, enormous arches with a large number of clay pipes were required to perform the work. While, by the invention of the second to the machine, the clay dug close at hand? To answer this question has been a matter to which a large amount of ingenuity has been applied. Until about the year 1840, draining tiles were made by hand, enormous arches with a large number of clay pipes were required to perform the work. While, by the invention of the second to the machine, the clay dug close at hand? To answer this question has been a matter to which a large amount of ingenuity has been applied. Until about the year 1840, draining tiles were made by hand, enormous arches with a large number of clay pipes were required to perform the work. While, by the invention of the second to the machine, the clay dug close at hand? To answer this question has been a matter to which a large amount of ingenuity has been applied. Until about the year 1840, draining tiles were made by hand, enormous arches with a large number of clay pipes were required to perform the work. While, by the invention of the second to the machine, the clay dug close at hand? To answer this question has been a matter to which a large amount of ingenuity has been applied. Until about the year 1840, draining tiles were made by hand, enormous arches with a large number of clay pipes were required to perform the work. While, by the invention of the second to the machine, the clay dug close at hand? To answer this question has been a matter to which a large amount of ingenuity has been applied. Until about the year 1840, draining tiles were made by hand, enormous arches with a large number of clay pipes were required to perform the work. While, by the invention of the second to the machine, the clay dug close at hand? To answer this question has been a matter to which a large amount of ingenuity has been applied. Until about the year 1840, draining tiles were made by hand, enormous arches with a large number of clay pipes were required to perform the work. While, by the invention of the second to the machine, the clay dug close at hand? To answer this question has been a matter to which a large amount of ingenuity has been applied. Until about the year 1840, draining tiles were made by hand, enormous arches with a large number of clay pipes were required to perform the work. While, by the invention of the second to the machine, the clay dug close at hand? To answer this question has been a matter to which a large amount of ingenuity has been applied. Until about the year 1840, draining tiles were made by hand, enormous arches with a large number of clay pipes were required to perform the work. While, by the invention of the second to the machine, the clay dug close at hand? To answer this question has been a matter to which a large amount of ingenuity has been applied. Until about the year 1840, draining tiles were made by hand, enormous arches with a large number of clay pipes were required to perform the work. While, by the invention of the second to the machine, the clay dug close at hand? To answer this question has been a matter to which a large amount of ingenuity has been applied. Until about the year 1840, draining tiles were made by hand, enormous arches with a large number of clay pipes were required to perform the work. While, by the invention of the second to the machine, the clay dig...
less work by the side of a field, on a capstan which, by
irritable wire rope, draws towards itself a low frame-
work, leaving but the trace of a narrow slit on the surface.
If you pass, however, to the other side of the field, which
is framed as has been said, yet it, been using after it a string of pipes, which—still following the
pipe's snout, that burrows all the white four feet below
ground—twists itself like a gigantic red worm into the earth;
not withstanding the weight, and by being withdrawn, the
capstan, the string is withdrawn from the necklace, and
you are assured that a drain has thus been invisibly formed
under your feet. The machine is worked by two horses;
capstan, firmly and easily fixed into the ground, affords a
firm and stationary support from a great load, an easy
power. The chief defect in the earlier specimens was an
inequality in the level of the channel excavated by the
pipe, because the upper and lower parts being fixed at an
ascending distance apart, any unevenness of the surface was
likeness hidden by an undulating drain below. This defect
was partially remedied afterwards; but the difficulty of
moving horizontally in the drain has continued to be an
develop to the use of this machine. The cost being
considerable, none but a large landowner would find profit
in keeping such a drain, but the use of the drain can easily
be kept up for a month, or other definite period.

The aggregate result of all these various improvements in
its construction and application of agricultural implements
the late Mr. Pacey, in reporting on this subject, as
Chairman of the Exhibition Jury, in 1851, made the following
estimate: That by using lighter ploughs, cultivators that lessen
the necessity for ploughing, drills that economise both seed
and labour-power, horse-hoes instead of hand-hoes, varied
means of management of all kinds, resulting in less
sickness, well-constructed carts instead of clumsy
wagons, fixed and portable steam-engines, steam-threshing
and winnowing machines, turnip and chaff cutters, drain-life
machines, etc., a drain of such a size has been got in
twelve years a quarter of a mile by half the outlay in culivating
a definite amount of crop. It had been rendered further
demonstrable that machinery had given comparative certainty
in agriculture, by enabling many of the operations, in doubt-
ful, invariable and always saving labour. The ploughs,
drills, etc., on which the cost of making and maintaining the
capstan, which could hardly have been done at all by the hand
method.

Mr. Evelyn Denison (afterwards Speaker of the House of
Commons) prepared a Report on the Agricultural Imple-
ments displayed at the Paris Exhibition De L'Industrie, in
1855, in which he endeavoured to estimate the material
waste accruing from the use of machinery in agriculture.
Mr. Sidney, at the close of 1857, gave a few figures intened
to work down the estimate to that year. In this last-named
estimate, Mr. Sidney had followed Mr. Pacey, in recognising
that the returns from the Exhibition—"reported by the late
Mr. Pacey prepared the Great Exhibition report—the land-
owners of the United Kingdom had expended ten millions
sterling in draining two million acres of land, on principles
of long continued experience. But, in estimating the
returns on the items already enumerated, there is that precious,
though not easily-calculated advantage resulting from the
economy of time, by employing machinery at full force
during short intervals of fine weather.

(Report of the Great Exhibition, 1851. Report of the
Parish Exhibition, 1855. Journal of the Royal Agricultural
Agr. No. 564; paper by Mr. Sidney.)

AVERAGES. It can scarcely be said to exist as yet in England. Notwithstanding the acknowledged
importance of exact information as to the amount of our
agricultural production and consumption, especially to
farmers, and the interest that is taken in the subject as shown
by the attention to the Mark Lane reports, which are little
better than ingenious guesses, no steps have yet been taken
to insure a correct estimate of the expected amount of the
incoming crops, and the state of live stock. Such estimates
as are made are derived from individual instances, than
which some more general and reliable results would be of
more service. By this means, calculating, and even of climate in England, make the
application of the doctrine of averages almost more indis-
putable in agriculture than in any other trade. It is by the
arrangement of individual parts that we arrive at something
like a scale. A large piece was made; but the avalanche,
and the more any subject has the appearance of change,
the more necessary it is that the experiences should be
reported, in order to arrive at the law expressed by an
average. The inconvenience and loss occasioned by the
abscence of statistical returns has been often felt. After the
harvest of 1846, the average price of corn for six weeks,
from the middle of August to the end of September, was
45s. 6d., the lowest price in the market since the first of
October. In October, the
price improved; but in November it again fell to 80s. But
as soon as the new year had begun, symptoms of scarcity,
manifested themselves, and the wheat of that same harvest,
which had been purchased by the farmers for about 5d.
anch and a half of quarters, reached the price of 102s. 6d.
per quarter.

In this case, a knowledge of the produce of the harvest
would have saved the farmer from the sacrifice of his
property at the beginning; it would have saved the country
three-fourths of the losses of this harvest, which were
occasioned by a sudden rush into the market for large
supplies; it would have probably saved considerable waste of
food during the period when it was improperly cheap; it
would have saved inconvenience to the foreigners in whose
markets our purchases inevitably increased the price of
wheat; and the gains of the merely speculating corn-dealers
would have been saved to the community.

The desirableness of some knowledge on so important
a subject has led many individuals to form, from the best
and most reliable sources of information, estimates which
show the unreliability of such estimates for any practical
purposes. Some endeavoured to arrive at it by taking the
agriculture of the kingdom, the proportion supposed to be cul-
livated, and the probable amount of produce, by Mr. Gregory King, who wrote in 1665, was among the earliest.
He estimated England and Wales to contain 30,000,000
acres, of which he supposed half to be cultivated. Daven-
port, Grew, Templeman, Sir William Potts, Arthur Young,
Mr. Bees, Mr. Porter, and others, have endeavoured to
make similar estimates varying from 31,648,000 acres, to
46,916,000 acres, which was the estimate of Arthur Young, and was adopted
by Mr. Pitt in his calculations for the probable amount of the income of the kingdom. In 1831, the amount
was stated at 37,834,916 acres, which was very much the estimate of Dr. Beets, who gave it as 38,498,572.
Others, again, have endeavoured to ascertain the consumption by multiplying that of each individual by the number of the population, but here they are materially, varying from 8 bushels to
10 bushels for each individual, an unsatisfactory difference
of one third. We will now enumerate what measures have
been taken in providing statistics by the government.

What are called the core averages, are entries or tables
originally intended to regulate the duty on corn; but if
modified and improved, they might be made an auxiliary to
agricultural statistics. For a century previous to the year
1861, such returns were collected from the principal seaports
of twelve maritime counties—entirely in relation to the
output of the kingdom. In 1861, the collection of these returns was appointed by the magistrates of the town or
borough in which the return was made, but his salary was
paid by the government. In 1821 a change was made. The
returns were forwarded to the inspector of corn, appointed
by the government for the counties of London and
Wales. Every corn-merchant, miller, baker, and maltster, was ordered to make weekly returns to the
inspector. The inspector provided a place for the recep-
tion of these returns; he posted up in some convenient
locality the gross weekly returns, with the average price
of each description of grain sold in the preceding seven days.
These averages were then forwarded to the Comptroller of
Corn Returns, in London, who added up all the gross
returns from all the inspectors, and struck a single price
average for the whole kingdom. In 1832, the collection of
the returns was regulated, as the duties on perfectly
cleared and freed from the admission of foreign corn for home
consumption. When the 'sliding-scale' came into operation,
there were several instances of the averages being tampered
with, in London and some of the other large towns. This
was done by fraudulent persons, with a view of lowering the
rate of duties by fictitious sales of large quantities of corn;
thus swelling the quantity returned, raising the prices, and lowering the duty. In 1848 a motive of economy,
in whether wise or not, was applied to the same end, without any increase of salary, in place of inspectors, as
the latter might die off, for taking the corn averages; and the
returns are believed to have suffered in accuracy from this
change. When the corn laws were repealed, further changes
were made; the returns were made valuable as a basis for
regulation of revenue, in that the returns are, at present,
considered as more accurate.
the agricultural statisticians. The list of towns whence the returns are made has been largely increased; in all the towns thus added, excisemen have been appointed instead of inspectors.

The returns, it is evident, showed nothing beyond the average prices. In 1832 the attention of the government was directed to the attainm't of more satisfactory results. In the previous year, a statistical inquiry had been made by a committee of the magistracy of Norfolk, respecting the state of the county. The committee sent circulars to 625 parishes; but 264 of these declined to answer the questions submitted to them, and the committee had no other resource than to infer from the 462 affirmative returns the 254 negative. Still, though imperfect, it was useful. Mr. Gladstone, in 1832, when the Statistical Department of the Board of Trade was established, Lord Liverpool thought the investigation interesting, and in 1839, when the Statistical Department of the Board of Trade was established, Lord Auckland saw the importance and necessity of obtaining correct agricultural statistics. Nothing was effected, however, until 1836, when the Board of Trade resolved to make a small experiment of its own. Circulars were sent to the clergy of 156 parishes in Bedfordshire, enclosing schedules of the returns required, and asking for co-operation. This experiment was a most signal failure; for out of 156 parishes only 37 returned any answer. It was a time when the clergy and the high Tory party distrusted the suspected radicalism of most new Government projects, and it was on that account an unfortunate period in which to make such a trial. In 1840, Mr. Gladstone, at that time President of the Board of Trade, stated in the House of Commons that the subject was under his consideration. The Board of Trade, the Home Office, and the Poor Law Board, next had a long correspondence in regard to it; and it was found that of these three three might undertake the management of a system of national agricultural statistics; and it appears to have been decided that, as constituted at the time, the Poor Law Board could not adequately fulfill its duty. In 1846 the Board of Trade resolved to make another attempt; and it was ordered that the poor law officers of the three kingdoms—North Hants in England, Mid-Lothian in Scotland, and Ballyborough Union in Ireland. The Irish inquiry was made by a private individual, and was satisfactory; the last inquiry managed by the schoolmasters of the respective parishes, and was equally successful; but the English inquiry was an utter and disheartening failure. The Board of Trade, in this last-mentioned case, addressed communications to the Board of Guardians of the different Unions; while the Poor Law Commissioners backed the application, by requesting the Board to employ their own paid officers to induce the occupiers of land to fill up the schedules that were sent to them. The result was almost nil; scarcely any returns were obtained; and it was stated that nothing less than compulsory powers would be available for obtaining the desired statistics.

The next attempt was made in 1847, when Mr. Milner Gibson, then Secretary of the Board of Trade, brought a Bill to make Provision for the Collection of Agricultural Statistics in England and Wales. By the provisions of that Bill, the duty of obtaining the statistical information was to devolve upon the Registrars-General of Births, Deaths, and Marriages, the superintendent registrars throughout the kingdom to be charged with the appointment of agricultural enumerators in their respective districts; the enumerators were to prepare lists of all the occupiers of land, and the mortgagees of the same; and blank forms to those occupiers, and to collect those blank forms after an interval of fourteen days filled up with the several entries of particulars. This being done, the enumerators were to classify the returns, and construct general tables from them. These tables were to be transmitted to the superintendent registrars, by them to the Registrars-General, and by him to the Board of Trade. These returns and tables were to apply to the month of June in each year. The Bill was a first time; but as the public had not yet learned to feel much interest in the subject, and various party questions were then on the table, the bill shared the fate of many others, and fell to the ground.

In 1854, an attempt was made to obtain complete statistical information. The Government was then in control of the Poor Law Board. The selection was unfortunate, for the impression was instantly received that the returns would lead to additional assessment, and no explanation removed that belief. In addition it was generally feared that such returns would be used against the farmers by their landlords in order to raise their rents, they, in very few cases, holding their farms upon lease. The West Riding of Yorkshire was the only division from which a complete return was procured. In all the other counties the returns were so inadequate as to be useless. Many Unions refused altogether, alleging that their officers had sufficient other duties to perform, and in some Unions up to a proportion of one half, where the guardians had consented, many parishes made no returns. In the West Riding 3,264 parishes were examined, and among them most of the Poor Law Inspectors. Notwithstanding their ill-success, and the many admissions that there was little that could be done in the way of a mere statistical inquiry, the Government was said that would be offered to the investigation of a farmer's affairs by Poor Law officials, the most of them represented that all that was required was a compulsory act; and accordingly the Lords' Committee embodied a series of resolutions in their report, recommending the government to allow a bill into parliament for two returns a year, in July and November, to be carried out by the same machinery. The government however have not yet adopted the recommendation.

Under these disadvantages we will endeavour to give a few of such statistics relating to agriculture as rest upon sure bases. It is quite certain that a rapidly increasing population must have been fed, and that the means of feeding them have been increased; and it is the action of the law of demand for food, and the action of the importation, or from improved cultivation. The following figures will give some notion of what has been effected in each division; unfortunately however, though the inclosures and population only apply to England and Wales, there is no separating the agricultural products of Scotland from that consumed in Scotland. The amount is no doubt very small, for wheaten bread was not generally used in that part of the kingdom in the early periods recorded; and from the vast improvement in cultivation during the latter portions of the century, it will be seen that a very small proportion of the sufficient corn produced in Scotland to supply the population.

<table>
<thead>
<tr>
<th>Year</th>
<th>Acres</th>
<th>Quarters</th>
<th>Inclosures</th>
<th>Increase of Pop.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1850</td>
<td>1,362</td>
<td>6,069</td>
<td>9d.</td>
<td>2,173,589</td>
</tr>
<tr>
<td>1851</td>
<td>1,459</td>
<td>6,069</td>
<td>9d.</td>
<td>2,532,525</td>
</tr>
<tr>
<td>1852</td>
<td>1,380</td>
<td>6,069</td>
<td>9d.</td>
<td>3,064,573</td>
</tr>
<tr>
<td>1853</td>
<td>1,459</td>
<td>6,069</td>
<td>9d.</td>
<td>4,026,573</td>
</tr>
</tbody>
</table>

The increase of population is taken from between each of the decennial enumerations commencing with 1801. The increase of course of must necessarily decreased, and the best lands will have probably been among the earliest enclosed. Since 1846 the inclosures of commons have been conducted by commissioners, and are passed in acts in groups, in which the whole parish of the land enclosed is the subject of the act; but whole since 1850 does not average more than a few thousand annually, while the population has increased in about the same proportion as in the previous decennaries. The result is a movement of the agricultural products to the south. The whole of the law of dem. The send period in this time the price of wheat on has on the whole decreased. The price of flour with France, from 1800 to 1815 inclusive, the average price per quarter was 84s. 9d. From 1816 to 1890, it was 78s. 4d.; from 1816 to 1830, it was 63s. 8d.; from 1831 to 1840, it was 67s.; from 1841 to 1851, it was 58s. 6d.; in 1852, 50s. 6d.; in 1853, 62s. 11d.; in 1854, 73s.; in 1855, 74s. 9d.; in 1866, 69s.; and in 1870, the highest price reached was 64s. in July, and the lowest in December.

All the statistical returns obtained by Government have a fiscal basis. The only real agricultural statistics we possess are those for hops, of which we know every cultivated acre and every pound of produce; and barley, of every bushel of the crop. The returns for hops and barley are exact; but when, as in the case of live stock, the duty is discontinued, no account is taken by it even of importations, though the Board of Trade in their monthly return give the number imported as obtained from other sources. The following is
the assistance of farmers; succeeded in removing their objections, and convincing them of the advantages; and by means of local branches of the parent institution succeeded in procuring complete returns for the kingdom. These have been continued annually, and through these returns and other information, are the most complete in their details of any yet known. Though the absence of similar returns of England deprives them of much of their value, they are still, conjoined with those of Ireland and the United States, a valuable source of information on the returns for 1866 and 1867. We may presume that the returns are from holders paying a yearly rent of 10l. and upwards (exclusive of tenants of woods, villas, fens, house-holders and the like) in all the counties of Scotland except Ayrshire, Inverness-shire, and Carlisle; and most of the towns of the counties of Perth and Angus, and of Bute which lies in Arran, in both years, and in Caithness, Sutherland, and Orkney, in 1856, where the returns are only from holders paying a rent of 20l. and upwards. Woods, small walks, houses, roads, and waste, are omitted in the calculation.

In 1856 the number of occupiers was 42,919; in 1857 there were 43,432. The number of acres under rotation of crop was 3,045,191 in 1856; of which, of wheat there were 283,592, of barley 165,729, of oats 916,644, of rye 4,030, of bere 15,368, of beans 40,470, of peas 4,617, of vetches 18,231, of turnips 490,131, of potatoes 149,331, of mangold 3,301, of carrots 1,255, of cabbages 1,345, of rape 1,407, of flax 273, of turnip seed 1,759, other crops 783, bare fallow 14,496, and grass 1,378, total 5,672,745. Leaves 1,602 of the total stated unaccounted for. The produce was 2,767,392 bushels of wheat, 5,581,970 of barley, 31,984,361 of oats, 6,560,257 tons of turnips, and 1,439,600 tons of potatoes. In 1857 the number of acres under crop was 3,656,672, of which there were wheat 223,169, of barley 198,387, of oats 938,613, of rye 5989, of bere 21,607, of beans 39,156, of peas 2867, of vetches 18,415, of turnips 475,501, of potatoes 139,919, of mangold 3,529, of carrots 1,401, of oats 303,912, of calves flax 1,634, of turnip seed 2,576, of other crops 777, of bare fallow 18,582, and of grass and hay in rotation 1,498,805, an excess of 999 acres over the stated total. The produce was 6,154,800 bushels of wheat, 6,343,034 of barley, 27,670,763 of oats, 6,938,160 tons of turnips, and 430,452 tons of potatoes. In 1856 the total number of horses was 179,833, of milk cows 209,960, of other cattle 475,364, of calves 197,709, of sheep and lambs 5,165,560, of swine 125,924. In 1857 the numbers were, of horses 185,429, of milk cows 303,912, of calves 195,198, of sheep and lambs 5,883,168, and of swine 140,324. In this account the horses, cows, and swine kept in towns are not included; and it is estimated that above 300,000 head of stock, and upwards of 200,000 acres of tillage are not included in the returns. These returns, it is true, do not show the greatest proportional acreage in wheat and in white crops generally, and Aberdeen and Argyle the greatest in turnips; those counties also possessing the greatest number of live stock.

In Ireland, where the interest felt might have been supposed to be less, statistical returns have been obtained in an excellent form, and with no opposition. The task of gathering the returns was confided to the statistical in 1856, and they have been continued annually since. We append the return of 1857:—In that year the returns show that there were 5,680,089 acres under crop, being an increase of 106,542 acres over the quantity in 1856. Of these 626,851 acres were in wheat, 1,570,076 in oats, 2,425,257 in barley, 1,537,036 in beans, peas, flax, and vetches, a small fallow of 1,480,000 acres, and a general, but a decrease of oats on 58,039 acres. On green crops there was a general increase of 45,637 acres, potatoes occupying 1,144,930 acres, an increase of 43,216 acres, and flax had decreased from 106,311 acres in 1865 to 90,074 acres in 1857; and turnips had decreased 4,487 acres. Meadow and clover had increased from 1,302,787 acres to 1,369,421 acres.

The produce of the 5,753,681 acres in cultivation in 1856, had been 2,735,193 barrels of wheat of 20 stone each; 3,775,045 barrels of barley of 16 stone each; 60,700 barrels of barley of 16 stone each; 72,156 barrels of rye of 20 stone; 431,661 bushels of beans and peas; 35,288,345 barrels of potatoes of 20 stone each; 1,145,281 tons of turnips; 325,650 tons of cattle; 3,066,553 tons (14 lbs.) of flax; and 3,492,732 tons of hay. The total number of holders of land was 692,498; of whom 36,474 held not more than one acre; 88,035 not more than five acres; 179,951 not more than fifteen acres; 192,455 not more than fifty acres.
thirty; 71,156 not more than fifty; 63,379 not more than one hundred; 21,293 not more than two hundred; 2943 not more than five hundred; and only 1655 held upwards of fifteen hundred acres.

Live stock, except sheep, had increased remarkably. The number of horses was 600,693, an increase of 27,395; the number of cattle 3,618,544, an increase of 30,686; the number of sheep 3,446,076, a decrease of 24,618. Pigs numbered 1,252,105, an increase of 256,657.  

Produce ships in Ulster are required to keep the road-sides and fences free from weeds, and surveyors in the other provinces are recommended to obtain authority from grand juries, etc., to enforce in them similar regulations.

Many foreign colonies have found the advantages of having statistical returns of their agricultural produce. Austria, Prussia, France, Denmark, Hungary, Belgium, and the United States of America, have all such returns more or less perfect, among which those of Belgium take a high rank, and are nearly equal to those of Scotland. Such statistics for the whole of a kingdom are highly valuable for the regulation of the inhabitants of that kingdom; but if we possessed them for the whole of the civilised world, what are called the chances of agriculture would probably be reduced to a certain and the price of food would remain with little or no variation.

AGRODROMA. [ALADDINE, S. 2.]

AEGRESTEMMA (from "agro", a field, and "temna", a crown), a genus of alyceae, is a kind of Cerealia. It appears in the order Caryophylloideae. It has several species, the best known of which is the Corn-Cockle, which is now referred to the genus Lychnis, or Gilboa.

AHU [COUNCIL OF].

AIGUILLON. [LOT-et-GARONNE.]

AIKIN, ARTHUR, the eldest son of John Aikin, M.D., was born in 1784. Arthur Aikin began his literary career, we believe, as editor of an annual called the "Limean" this was a page of the first six volumes of which—1803-1808—his name appears as editor. His earliest scientific work was ‘The Manual of Mineralogy,’ of which the first edition was published in 1814. Besides these he was the author of a ‘Tour in North Wales,’ a ‘Dictionary of Chemistry and Mineralogy,’ and a ‘Dictionary of Arts and Manufactures;’ and also of numerous papers in various scientific journals. For a long series of years Mr. Aikin was the resident secretary of the Society of Arts, and a frequent contributor to its ‘Transactions.’ He was also one of the oldest followers of the Linnean and Geological societies. Mr. Aikin was a map of quiet retiring habits, and outlived his scientific reputation; but was well known in scientific circles as one of the most regular and assiduous attenders at the meetings of the metropolis, and was generally esteemed. He died at his house in Bloomsbury, London, April 16, 1854, in his 81st year.

AIRA, a genus of Grasses belonging to the tribe Sclerenteres, and of which the best known species, A. canescens, the Tufted Hair-Grass. It has long and flat leaves, with a fibrous perennial root. It flowers in the beginning of August, and reaches a height of 12 or 15 feet. It grows naturally on marshy damp soils, in the form of large tufts. It is a wiry harsh grass, and is rejected by domestic animals. It may, however, be advantageously sown as a cover crop, or by the side of manure-harvests for swine and wild fowl. (Lawrence, Acrographia.)

AIRE, RIVER. [YORKSHIRE.]

ALTONIA (after Mr. W. Allon, for many years head-gardener at Kew) a genus of plants belonging to the order Melaceae. The A. concinna is a native of the Cape of Good Hope, and is cultivated in our greenhouses.

AKHALZIKH, a town in Russian Armenia, situated near the watershed between the Black Sea and the Caspian, on a few miles from the Perenagh Dagh, in 41° 40' N. lat., 43° 10' E. long. Population about 15,000, who are chiefly Armenians. It was formerly the chief town of a pashalik in Turkish Georgia; since thecession of which province to Russia, it is the capital of the province.

Among the buildings of the town are the mosque of the eldest of the califeh at the mosque of Ahmed, which is built on the model of that of Santa Sophia at Constantinople. Connected with the mosque is a college, and a library rich in

Oriental literature; but it is said that the best works it contained have been carried away to the royal library of St. Petershurg. The Armenians have several large churches, and there is also a synagogen. The chief trade is in silk and wool. There is some trade in wine, and the town lies on the road between the port of Batoum and Tiflis, being 80 miles E. from the former and 105 miles W. from the latter.

AGOAS, a province o f Brazil, which, up to about 1840, was a district, or comarca, of the province of Pernambuco; but, on account of its increasing population and wealth, was formed into a separate province, which is under the administration of its own governor. It is situated between 9° and 20° 3' S. lat., and 35° 30' and 42° 40' W. long., on the south of the province of Seregipe del Rey, from which it is separated by the Rio de San Francisco, along the northern banks of which it extends to the great cataract, called Cachoeira de Palmo Afsom. On the west and north it is surrounded by the province of Pernambuco, from which it is separated for a considerable space by the Rio Unna. The Atlantic washes its eastern side. In length, from east to west, it extends about 150 miles; its average width probably does not exceed 60 miles. The area is about 900 square miles.

Two-thirds of this surface are covered with mountains. They form the southern declivity of the elevated and hilly table-land, which occupies nearly the whole of the country, and is intersected by a series of broken mountains. These mountains come close up to the river San Francisco as far east as the mouth of the Rio Sacare, and terminate in Alagoas, at a distance of about 20 miles, or little more, from the sea. This region is almost entirely covered with wood, and is traversed by numerous rivers, which afford a considerable article of exportation. The valleys and more gentle slopes of the mountains exhibit a considerable degree of fertility. Along the eastern base of the mountains export products to the river, and to the sea. Though it is little wooded, it is covered with a light soil, very rich for the culture of cotton, which is extensively raised. The country along the sea-shore, and at a distance of about 10 miles of it, is covered with the best alluvium, which has been brought down by the numerous small rivers that rise on the eastern declivity of the mountain-region, and deposited along the edge of the inundating tract. This soil is of the best quality, and fit for the cultivation of every kind of intertropical productions. A considerable portion, however, of this tract is still covered with swamps, and the tide, which rises along the coast from 3 to 5 feet, enters the mouths of the rivers, and has changed the adjacent surface, forming a great number of lakes and lagoons. The larger lagoons is the Lake of Mangua, from which the river Alagoas runs to the sea in a southern direction. It is stated to be 30 miles long, and about 3 miles wide at an average, and consists of two lagoons united by a strait. The northern lagoon is the port of Sambod, and the southern, which has its water is salt. Only canoes can navigate the river Alagoas, which carries its water to the sea. The rich plantations situated around the Lagoa do Sul carry produce to the northern lake and the town of Alagoas, whence it is transported to the harbours of Taranga and Pajamsar. Farther south is the Lagoa do Siquilhas, which is 15 miles long from north to south, with an average width of 3 miles. A river of the same name runs southwards to the sea. The country along the coast which lies to the west of this coast is small, and have bars at their mouths, with so little water on them that sea vessels of even the smallest size cannot enter them, the province has a few harbours sufficiently deep for vessels of moderate magnitude. The most northern are the harbours of Pajamsar and Taranga, which are close together and separated by a low tongue of land. The port of Taranga is the better of the two. Merchandise disembarked at this port is transported by land three miles to the Lagoa del Rey, by a splendid road, situated just to the northeast of the town of Alagoas. Curriphe, which is farther south, is a harbour of moderate size, formed by a reef extending to a distance of 300 yards from the shore, which breaks the fury of the sea. The harbour may be entered by two breaks in the reef, but vessels of over 10 tons cannot enter. Waters are deeper here into the sea bears the same name, and is navigable for canoes for several miles, but has very little water on the bar at its mouth.  

The only river which here deserves to be noticed is the
San Francisco, which enters Alagaoas at its western extremity at the great cataract of Paulo Afonso, where it is said to descend 50 feet in perpendicular height. It then runs for many miles to the left of the Alacundo, forming several small and smaller cataracts, between rocky banks several hundred feet high, and extremely rugged. Many rocks occur in the bed of the river, and it is not navigable. At Caninde the width of the river increases to half a mile and more. There, as the banks are of moderate height as far down as Penedo. Below Penedo the river enters the alluvial tract, in which it divides into several branches, forming a great number of islands, generally low and abounding with woods. They have a thousand varieties, which are all worked by using sun, fire, and vegetable acids. The banks are raised in abundance.

Bark, mastic, copaiba, and timber-trees, are abundant. It is said that the trees of many species of beans, like the massar, are rare. They are abundant near the mouth of the river. The fertile coast among these trees, is so extreme that mountains can enter it only at high-water, and must there wait for the full tide to go on. They can sail as far up as Penedo, 25 miles from the mouth. Father up the navigation is solely by ajoes, that is, two or more canoes moved together with cross-pieces of timber. In ascending the river sails are always used, as the wind from eight o'clock till the following morning's dawn blows always from the east. The ajoes always descend the river with the current, which is rather rapid. The width of the river at its source is about one mile, and in the rainy season is frequently oppressive, except along the coast, where it is moderated by sea-breezes. It is less hot in the dry season, and also more healthy. The wet season occurs from November to March, and then the rains are very abundant, but showers are not rare in the dry season also.

Tobacco was once the staple article of this province, and was especially sent to the western coast of Africa; but since the abolition of the slave trade this branch of agriculture has entirely been decreased. Tobacco may be replaced by sugar and cotton, which at present constitute the staple articles, the first being raised in the alluvial and the second in the inundating tracts. As food are raised—mandioca, maize, rice, plantains, beans, and some roots, as yams, sweet potatoes, &c. but the chief dependence of the province is on the fruit-trees, cacao-nuts, and palms. The cacao-tree is carefully cultivated in some districts on account of its oil, which affords as article of exportation. Alagaoas has extensive forests of timber-trees, even in its lower districts, and affords the best timber in Brazil. It is exported to Bahia and Recife; and many small vessels are built in the province. Some of these timber-trees are very durable, especially those named sengupira, fareno, vinbatico, and tacho, but their wood affects the ship's timber. The houses of the fazendas are all built of wood, and are marked from the great quantity of tannin contained in the wood. The forests abound also in several kinds of wild fritters, and there are also the trees which produce drunk's blood, maistic, specchunias, cuphea, and cacachoe. Other trees abound of the same character. Brazil-wood is the most prized. An inferior species of quinine, or Jesuit's bark, is not rare.

The European domestic animals are far from being numerous, except asses and mules. The oxen exist at present only in the mountain-districts. The most numerous animals are deer and monkeys of different kinds, and also ant-eaters, smallsquirrels, and others. The tapir and peccary are rather rare. Alligators abound in the lakes and rivers; land-lizards are not numerous, but they are very great, especially of parrots. Honey and wax are obtained from wild bees. Several kinds of fish abound in the lakes and lagunes, and on the sea-coast, and they constitute one of the principal articles of food for the lower classes and negroes. There is a great and rather short and strong, the upper mandible being strengthened without any notch, and not longer than the under. The nostrils, situated at the base of the bill, are olong, and protected by small plumages and bristles directed forwards. The feathers on the sides of the head can be raised up at the will of the bird into the form of a crest.

Agriculture is the principal occupation of the inhabitants. Only a few persons are employed in the exercise of the most necessary arts of civilised life. Common cotton-cloth is made in the fazendas, but the manufacture of good goods is imported. Boat-building is the most important branch of industry.

The province returns two senators and five representatives to the imperial parliament. In this province is one city, Alagaoas, and seven towns, namely, Porto de Pedras, Porto Caleo, Mateayo, Anadia, Atalaya, Pousim, and Penedo. Besides these places, there is San Miguel, which is built about 10 miles from the sea, and is a populous place in a very fertile district. The village of Caninde, on the Rio de San Francisco, is the place where the navigation of the river terminates. Goods destined for the consumption of the country adjacent to the upper course of the river are here disembarked, and transported on the backs of negroes a few miles to the tributaries, which are about 30 miles distant, and built where the cataracts begin. They are again embarked, and carried in boats to the places of consumption.

A railway has been projected from Pernambuco to the cataract of Paulo Afonso, which will pass through the best part of this province, and connect the country along the San Francisco with the important city and port of Pernambuco.

(Henderson's History of Brazil; Spix and Martinis Reise in Brasilien.)
of a grayish white, with specks of a brown colour. They frequently rear two broods of young during the summer.

3. Some remarks on the Skylark, for which there are many in Britain, where some remain during the winter, the greater number flock together and migrate, either southward or to the sea-coast. During these migrations immense numbers are caught in nets for the table, particularly on the continent, where small birds are more sought after for this purpose than in Britain.

Localities.—Europe and America.

Mr. Swainson considers this as the Fisistrous type. Examples are—Alauda africana, for the S. coast of Africa; A. montana, for the E. coast of Africa; and A. australis, for the S. coast of South America. The Skylark is placed in C. lengthened to equal, A. Alouetta cinerea, and A. alouettæ des Charmes of the French; and Loloa, Lodoa Canarias, Lodoa de Passy, and Lodoa de Montagna of the Italians; and Lodoa Sericata of the Germans; and Skylk (Scotch Lowerv) of the modern British.

The Skylark is well known, from its inexpressibly beautiful song, chanted forth far up in the air when at liberty and in its natural state, to require any description. Food.—Insects and their larvae, with many sorts of seeds and grain.

Notes.—On the ground. Eggs four or five, greenish white, spotted with brown.

Localities.—All the parts of Europe; also in Asia and the northern parts of Africa, but not the south of the vast continent (Temm.); the whole of Europe within the temperate zone, many parts of Asia, and the north of Africa. (Selby.)

Calendula. (Linn.)

Bill thick, much compressed; the column curved and convex; the commissure arched; the tip of the upper mandible wide and inflexed. Wings long or moderate; the first quill very small and spurious; the second nearly equal to the third and fourth; lesser quills short, emarginate. Tail slightly forked. Lateral toes equal. The Denticroto type—C. magnirotiro, *Ois. d'Aftr.*, pl. 192. (Sw.)

Subgenera—Myopora, Horst. Bill as in Calendula. Wings short; rounded; greater quills hardly longer than the second; four toes, the first longer than the half length of the second, which is shorter than the third; the third, fourth, fifth and sixth, equal, and longest. Tail short, even. Legs long—*M. Javanica*, 'Linn. Tr.', xii. 159. (Sw.)

Bracomyza, Sw. (Brachomyza.)—Bill as in Calendula. Hinder claw very short. Wings and tarsi much lengthened. Africa. (Sw.)

Agrodrus. (Sw.)

Bill slender, considerably compressed; both mandibles of equal length; the tip of the upper not reflected over the lower, and with a small notch, almost obsolete. Wings long; the first four quills nearly equal; the rest rapidly diminishing, and emarginate at their tips; tertials lengthened, preceded by the middle quills. Tail moderate, even. Legs pale, long, slender. Tarses long, slender. Lateral toes equal, but the outer claw shorter than the inner. Colour brown, lark-like. Distribution universal. The pre-eminent type—*Agrodrus refractus*, *Enl.*, 691, f. 1. (Sw.)

Macronyx. (Sw.)

Bill slender, compressed, thrush-like, entire; nostrils large, naked, the aperture lateral. Wings short; the pri-


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**Fossil Larks.**

Dr. Buckland figures a lark (Alauda) among the land Mammifers and Birds of the third period of the Tertiary Series, in the first plate of the illustrations of his 'Bridge-


and between 153° and 162° 40' W. long. It is more than 30 miles long, and opposite the mouth of the river Nahnek (157° W. long.) 110 miles wide, but its breadth decreases in proceeding farther west, where in some places it is hardly 90 miles wide. It terminates at the strait of Innassak, which separates it from the island of Cominak.

The two coast-lines differ greatly in aspect. The southern shores rise with a steep ascent, are indented with numerous inlet and bays, and lined with numerous islands, separated by water, some wide and others quite close together, and in some places extending to a distance of ten, and nowhere less than five miles from the coast. Between these islands and the coast the sea is commonly very deep. The northern shores are much more elevated. When his term of service was over, he went to Sandy Beach, and has only a few open bays, but it is free from the inlets and shoals, and offers in many places an encampment of moderate depth. A chain of mountains extends through the peninsula from the strait of Innassak to the limits of Illamna along the south-eastern shores, but east of 158° W. long., its highest part is at a greater distance from the coast than to the west of that meridian. It contains several very elevated peaks towards its western extremity, and four at least are always covered with snow, but have no glaciers.

It is remarkable that in the western and more elevated portions of the chain, which consists mostly of volcanic rocks, and where some still active volcanoes exist, there occur four large lakes. These contain the water that accumulates in a sandy beach, and has only a few open bays, but it is free from the inlets and shoals, and offers in many places an encampment of moderate depth. A chain of mountains extends through the peninsula from the strait of Innassak to the limits of Illamna along the south-eastern shores, but east of 158° W. long., its highest part is at a greater distance from the coast than to the west of that meridian. It contains several very elevated peaks towards its western extremity, and four at least are always covered with snow, but have no glaciers.

The coast is indented with a number of bays, which are filled up by sand in the process of time. The low country along the Bay of Kalakoo consists mainly of sand, covered in many places with swamps, and in others with marshes. Their growth on it, and abundance of dwarf willow and alder, but no trees. Along the southern coast, especially east of 158°, also occur some level plains at the innermost recesses of the bays; they do not much differ in places from the sand but are covered with enormous forests, and the vegetation is much more vigorous, and the bushes attain a greater height. The best harbour on the north-western shore is in the Bay of Moller (56° N. lat., 160° 40' W. long.), between which and the Bay of Pavlovskaia the peninsula is separated by a strait of about 4 miles. On the south-eastern coast several harbours are met with. The most considerable from east to east are Morjewskaia, Belowskaia, Pavlovskaia, the Bay of Wrangell (150° W. long.), the best of them all, and Bay of Kamtschatka.

The Russians have found among the natives of both shores, introduced agriculture, and though no kind of grain succeeds, the inhabitants of the few dispersed villages raise considerable quantities of potatoes, and in some places they have introduced rye, one of which their principal subsistence from fishing, the sea abounding in cod, seals, turbot, and several kinds of molluscs. Whales are frequent along the northern coast, but rather rare on the southern. Morses in immense numbers visit the northern coast, and their teeth constitute the principal article of commerce, since the sea-otters, which formerly were very plentiful, have been nearly destroyed by the avidity of the inhabitants. Reindeer, bears, and red foxes, are the only large animals which are found in great numbers, but towards the east they are very scarce, and perhaps if the musk-ox. Seals and sea-lions visit the deeper inlets, and afford to the inhabitants some additional articles of commerce.

The number of settlements made on this peninsula does not exceed ten. Those west of 155° W. long. are dependent on the establishment of Onalashka, and those east of it on that of Kodiak. The largest of those settlements is the town of Kattalekoi, on the Bay of Kattal, which has 90 inhabitants.

The number of settlements made on this peninsula does not exceed ten. Those west of 155° W. long. are dependent on the establishment of Onalashka, and those east of it on that of Kodiak. The largest of those settlements is the town of Kattalekoi, on the Bay of Kattal, which has 90 inhabitants.

Alkantoa, a genus of plants belonging to the natural order Apocynaceae. It was named after Frederick Allaman, a surgeon who travelled in Guiana, in 1769, and afterwards A. Russia. He was a correspondent of Linnaeus. The species of this genus are shrubs yielding a milky juice, with verticillate leaves, and many-flowered peduncles of large yellow flowers. They are worthy of cultivation on account of the beauty of their flowers and foliage. They are all natives of South America, and when cultivated require a strong moist border to grow freely. An infusion of the leaves of A. cathartica is said to act as a powerful purgative, and an overdose to produce poisonous effects.

Allan, Sir William, was born in Edinburgh in 1793. After receiving his early education at the High School, he was placed with a coach-painter, but displaying a strong attachment to art, he was entered as a pupil in the Trustees' Academy, where Willie was his fellow-student. He returned to his native town, and became a student of the Royal Academy. In 1805 his first picture of a 'Gipsy Boy and Ass' appeared at the exhibition of that institution. Not succeeding in at once attracting public attention, Allan resolved to try his fortune abroad, and selected St. Petersburg for the scene of his experiment; incited partly, it is said, by the expectation of finding novel and picturesque objects for the exercise of his pencil. He remained in Russia nearly ten years, making occasional journeys to distant parts of the country, to Turkey, Tartary, the shores of the Black Sea, &c., and voluntarily employing himself in gathering materials for his art.

On his return to Scotland in 1814, he made a public exhibition of his pictures, and finished painting the Russian, Tartarian, and Circassian scenes and costumes. Among the pictures was a large one of 'Circassian Captives,' which at the suggestion of Sir Walter Scott was purchased by one hundred gentlemen, who subscribed ten guineas each; it fell to the lot of the Boy and Ass. In 1819 he returned to Scotland, and for several years was mostly engaged in illustrating the history or the romance of Scotland. To this period belong the 'Murder of Archbishop Sharpe,' 'Parting of Prince Charles Stuart and Flora Macdonald,' 'Knox Admonishing the Mary Queen of Scots,' 'Murder of the Regent Murray,' and others of his best works. In consequence of a disease in the eyes he was compelled for a year or two to cease from painting, and being advised to try a change of climate, he visited Italy, Austria Minor, and Greece. On resuming his pencil, his 'Slave Market at Constantinople,' and pictures of a like kind, showed that he had profited by his travels.

Meanwhile he had been gaining the distinctions awarded to success in his profession. In 1820 he was elected a member of the Royal Academy. In 1830 he was President. In 1836 he was elected a Royal Academician. In 1838 he was elected a Fellow of the Royal Society. In 1840 Allan was appointed to succeed him as President of the Society of Painter in Water-colours, which is the highest honour of knighthood. Sir William Allan was best known by his Russian and Circassian genre pieces, and by his Scottish historical works. In all of them there is much skill and refinement, but in none any very evident marks of a high order of genius. But he was also a very successful painter of a special class of portraits, such, for instance, as his 'Scott in his Study Writing,' and its companion, 'Scott in his Study Reading,' in which his genius is most completely displayed. His pictures of the Battle of Waterloo, which met with the marked approval of the Duke of Wellington, and of which his grace purchased; the 'Battle of Preston Pans;' 'Nelson Boarding the San Nicholas and Bannockburn,' a large painting, on which he was engaged at the time of his death. One of his last considerable works, 'Peter the Great teaching his Subjects the Art of Ship-building,' was a commission from the Emperor of Russia.

Sir William Allan died on the 23rd of February, 1850. As a painter he was generally acknowledged by his countrymen to be at the head of Scottish art, by right of his talent as well as of his industry.
follow the same profession. Having completed his education at St. Paul's school, he for a time practised as an usher in Tavistock, near where he was more advanced he had for a long period to manufacture paintings for picture-dealers. Under the necessity of producing many showy pictures at low prices, he soon acquired considerable mechanical dexterity, and he was led not unnaturally to turn his attention to scene-paint- ing. He painted some pictures for the London Royal Academy, working for a while as assistant to Stanfeld and others, and he obtained the situation of principal scene-painter at the Olympic Theatre, when that establishment first came under the management of the late Mr. Vandyke. Allan's art, his artistic style and good pencil did much to secure the success of the brilliant spectacles which formed the distinguishing feature of the management. Allan's early oil-paintings were generally of small size, and represent quiet, homely, pastoral scenery, which was rendered with great delicacy, and a nice appreciation of the freshness of natural colour. But though they found purchasers among well-known patrons of art, his reputation extended slowly, and he attributed his tardy progress to the placing of his pictures at the annual exhibition. He painted for the newly-founded Society of British Artists, and became one of its most ardent supporters. All his most important works were therefore exhibited in the first instance on its platform only, and consequently became his key pictures.

Allan did not attain the position his early pictures promised. His inclination and his forte lay towards pastoral scenery. He loved and he could well depict those fresh, open, country scenes, so characteristic of our home counties, which Milton describes as affording constant delight to the city dweller. For these Allan had all a Londoner's relish, and while he painted them with continual reference to the reality, his pictures commanded the sympathy of all who enjoy this style of art. But when he had a chance of indulging in it, he turned his attention to various scene-paintings, which are so attractive in conjunction with gas light and theatrical properties, he began to employ them in his pictures, and though he succeeded by such means in sparing himself much thought and labour, while he rendered his pictures more attractive in the exhibition-room, it was at the expense of those higher qualities of truth and propriety which are essential to lasting fame. And the evil was fostered and strengthened by another influence under which he laboured for some time; he attempted to paint real scenes and more with a special regard to them. His earlier pictures have many admirable qualities, and his latest display great technical and manipulative skill; but his life was not one of artistic progress, and his is not a name that can permanently take a high place among the artists of England.

Allen died August 26, 1855, of disease of the heart, at the early age of 49; leaving a widow and eight children, for whom unhappily he had not been able to secure a sufficient provision.

ALLOW. [CUMBERLAND.]

ALLTOIN, ALLANTOIC ACID. [CHEMISTRY, S. 1.]

ALLOXAN, ALLOXANIC ACID, ALLOXANTIN. [CHEMISTRY, S. 2.]

ALLYLE. [CHEMISTRY, S. 2.]

ALMADINE. [GARRET.]

ALPINA, a genus of plants belonging to the natural order Zingiberaceae. The species have thick tuberous horizontal roots, which are internally mucronate, with thick corolla- ceate leaves, having a silt glutinous sheath. The flowers are in panicles, or loose racemes or spikes. The tube of the corolla is short, the inner limb 1-lipped. The filament of the stamens linear. The fruit is capsular and 3-celled, with very few seeds.

A. Galangana is a native of Sumatra, and is cultivated in the Indian Archipelago. Its roots are pungent, acid, and aromatic, and are often substituted for ginger. They are sold by druggists under the name of Galanga major. A plant related to, if not identical with, the A. esculata of

Linnaeus, is called Coromandi in British Guyana, and is described by Dr. Hancock as a bitter pungent plant, and when boiled has a strong acrid and diuretic, and in large doses as emetic. [GALANGA.]

ALTKIRCH. [CHEM.]

ALUMINA. [CHEMISTRY, S. 1.]

ALUMINUM. [CHEMISTRY, S. 2.]

AM, a district in Kurdistan. The town is situated upon a lofty isolated rock in 36° 47' N. lat. 43° 21' E. long. in a plain which is screened on the north and south by mountain-ranges and drained by the Ghar River, which flows southward into the Tigris. The town range called Ghar is thickly wooded, and in parts precipitous and very difficult of access. It separates the Amidiyah district from the country of the Miskoit Kurds. The northern range, which is also well wooded but seems to be so high as the southern part of the plain of Amidiyah from the extensive valley of Berwari.

The plateau of Amidiyah is cut up into innumerable ravines by the torrents which rush down the mountainous into the Ghar River, by which they are carried to the Zab. It is well wooded with the gall-bear and oak and with the fruit and forest trees. It contains many villages, which were formerly inhabited by Chaldean or Nestorian Christians and were very flourishing, but many of them have been deserted by the inhabitants in order to escape the violence of the Kurds and Turks; and those that remain have joined the Roman Catholic Church. Around the town and the villages are well-cultivated gardens and orchards. Tobacco, rice, grain, water-melons, fruit, and gall-nuts are very plentiful in the country. Kerr, in his Agriculture, lays down that it was previously affording little encouragement to cultivate the land.

The town is described by Dr. Layard as a heap of ruins; porches, basseas, baths, and habitations were laid open to their immemorial recesses; every part seemed crumbling to ruin, and nearly deserted; for the population at the time of his visit, in August, had retired to their summer habitations in the mountain valleys. The fort or castle, which is surrounded by walls flanked with towers, is considered of great importance as a key to Kurdistan and is defended by a garrison of 300. The fortress and Turkish and Kurdish influence have considerable importance and strength, and contained a very large and flourishing population. It was governed by hereditary pashas, who traced their descent from the Abbasides, and were on this account always regarded with religious respect by the Kurds. The ladies of their family enjoyed the title of Khan. Ismail Pasha, the last of these hereditary chiefs defended himself long against the Turks in his inaccessible castle, but at last a mine was set beneath the fort, which was set on fire, and the castle itself was consumed. Under the present pashas the fortress is safe from attack, and the place was taken by assault.

Amadiyah (which is said to mean 'Town of the Medes') is frequently mentioned by early Arab geographers and historians, and its foundation most probably dates from the time when the Medes were subdued in B.C. 518, and it was called Batalana. To a defaced bas-relief on the rock near the northern gate, Dr. Layard assigns the date of the Aegacian kings. Amadiyah is proverbially unhealthy. Fever and agues are very prevalent in summer, at which season the population remove to the neighbouring mountains, in the valleys of which they live in tents and osuils, or sheds made with boughs. The population has greatly diminished since the place became subject to the Turks.

Dr. Layard's Minnie and the Remnants; Colonel Cheshy's Expedition to the Euphrates and Tigris, &c.

AMALFI. The story of the discovery of a copy of the Pandecta at the siege of this place, a.d. 1137, is now considered entirely without foundation. (Savigny's Geschicht des Römischen Rechts im Mittelalter, Heidelberg, 1815, 6 vols. 8vo.)

AMAND, Sr. [CHEM.]

AMBLEVE, the Savoy name of the Mezlar, a genus of plants belonging to the sub-order Pomaceae (Pometia), of the order Rosaceae. It has 5-cleft calyx with lanceolate petals, and an ovary of 10 cells, with a solitary ovule in each. The mature fruit is 5-celled, with one seed. It seems to be a species of the stuffed deciduous leaves, and racemes of white flowers.

A. vulgaris, the common species, is a native of rugged places throughout Europe. It is the Aetoma rotundifolius of Pers.”

A. Botryopus, the Grape-pear or Canadian Medlar, is a

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very common plant in Canada; it is also a native of New-
tisland, Virginia, and the higher parts of Columbia. It is
found wild in Europe, and cultivated for the sake of its
garden varieties. A. scusa is also a shrub 6 or 8 feet high, and is a native
de North America, throughout Canada from Lake Huron to the
Saskatchewan and Mackenzie rivers, and as far as the
Rocky Mountains. Sir John Richardson says that it abounds at
those places, and is highly serviceable as a food for
dogs. It is also much used by the Indians for making arrows and pipe-stems, and is thence
tumed by the Canadian voyageurs 'Bois de Flêche.' Its
flowers, about the size of a pea, are the finest fruit in the
country, and are used by the Indians both for food and
medicine. They make a very substantial addition to pemmican,
and excellent puddings very little inferior to plum-pudding.

Another North American species is known by the name of
A. enneasquama. Its fruit is of a blood-red colour.

The Asimines, which are the species of A. enneasquama. possessed by the Superior Courts of Law have been greatly extended
by the Common Law Procedure Acts of 1832 and 1844; and
both of which expressly require that all amendments shall be
made which are necessary for the determination in the ensuing or
the question in controversy between the parties.

**AMERICA.** In the article AMERICA, in the 'Penny Cyclopaedia,' the narrative of discoveries terminates with the
voyage of Captain Ross (afterwards Sir John Ross), in search of
the North-West Passage, and there he made a northern passage, without
return till 1833. He was forced to pass four successive
winter in the dreary regions of Boothia Felix, and emerged
with his crew from the icy seas when the hope of return was
almost universally abandoned at home. The
expedition took the title of the basin of the
Large North-West, through the munificence of Sir Felix Booth, a London
ddler, some additions were made to our stock of geo-

The expedition was sent out in 1833 on a land journey in search of the
pre-
ceeding expedition; and he traced the Back River, named
him. Having returned in 1836, he was again appointed
the commander of an expedition in 1838, which was destined
to proceed to Wager River and Repulse Bay. This was a
most disastrous voyage, the expedition having to pass the
winter in the ships tossed about in the ice. No geographical
results were gained. During the years 1836 to 1838, Deas
and Simpson, two officers of the Hudson's Bay Company, sur-
ted the Great lakes and Territories in the western
American continent, leaving only the southern part of Boothia
fjord, of the entire coast line, unexplored. This latter portion
was surveyed by Dr. Rae in 1848. In 1846 one further
expedition started under Dr. H. Imlay, that sailed from the
North-West Passage, when the expedition under Sir
John Franklin was despatched to Lancaster Sound. The
expeditions which have been sent out in search of Sir John
Franklin and his associates, and the discoveries which have
been made in the Arctic Regions, are described in the articles
North-West Passage, S. 2., and Polar Countries and
Straits, S. 2.

The progress of discovery and settlement in the territories
of the United States has proceeded without interruption, and
new States and Territories have been established since the
article AMERICA was written, which are described under their
respective names in the two Supplements. Among the
discoveries which have enabled the government of the United
States to extend its possessions, none are more important than
a discovery made by Lieutenant Fremont in his exploring expeditions of 1842,
1843, and 1845. The tides of emigration have since swept
the east to the west through the passes of the Rocky
Mountains, and the country has been opened up from
Mexico, and the important State of California, and
town of San Francisco with its capacious harbor, estab-
lished on the shores of the Pacific Ocean. The
discovery of gold in California has led to many important explo-
ations, the Sales of lands throughout the Territories have been carried out,
and the territory of Utah added to the United States, on the
western side of the Rocky Mountains. On the eastern side
aircraft have been formed in various directions to the extent of
more than 20,000 miles; and several important exped-
tions have been dispatched, by order of Congress, to discover
the best route for a railway from the Mississippi to the
Pacific between the parallels of 38° and 49°. These expe-
ditions, conducted by gallant and skilful leaders, have contributed very largely to American geo-
ography, observations having been made from the Mississippi to the
Pacific, between the parallels of 49° and 47°, 41° and
and near those of 38°, 36°, and 35°, touching upon the
Marquesas Islands, and to the north of San Pedro and San Diego. On the results of these labours the Secretary of
War has reported, that "the route of the 32nd parallel is, of
those surveyed, the most practicable and economical route
for a railroad from the Mississippi River to the Pacific
Ocean."

In British North America, an extensive region, including at
least 112,000 square miles, remains almost completely
unexplored. This region extends from the ocean to
the foot of the Rocky Mountains, and from the
northern branch of the Saskatchewan to the
parallel of 49°, which forms the boundary between the British
possessions and the United States. The expedition of
this portion of British America has been undertaken by Mr.
Palliser, a traveller who has spent a considerable time in
the neighbouring districts of the Upper Missouri. For the
purposes of this expedition the Lords of the Treasury, on the
recommendation of the Secretary for the Colonies, have
made a grant of £50,000 to Mr. Palliser, and Lieutenant
Blakiston of the Royal Artillery, Mr. Bourgeois as a guide,
and Dr. Hector a medical gentleman, have been associated
with Mr. Palliser. The chief objects of exploration are
stated to be, 1, the exploration of the water-parting between
the Missouri and Saskatchewan rivers; 2, the
exploration of the Rocky Mountains, for the purpose of
ascertaining the most southerly pass across to the
Pacific, within the British territory; and, 3, to report on the
natural features and general capabilities of the country, and
construct a map of the routes. The expedition sailed on
the 9th of May, 1857, and having arrived safely at New York,
proceeded to Fort William on Lake Superior, and thence to
Lake Winnipeg. The

The great project of communication by a ship-channel between
the Atlantic and Pacific has led to the investigation of routes
across the narrow Isthmus of Panama by different exploring
parties, but no route has yet been discovered which will
admit of a ship-channel being formed without locks or tunnels.

In South America, not long after the important journeys
of Spix and Martius, three European travellers crossed the whole
breadth of this continent, from the Pacific to the Atlantic,
descending the Amazonas, which was first explored by the
British expeditions of eighteen hundred and sixteen,
under Captain H. L. P. C. R.N., in 1828; Dr. Poppig, in 1831; and
Lieu-t. Smith, R.N., in 1834. Of these travellers Poppig added most to our
geographical knowledge. He went first to Chili, where he
spent two years; and then to Archangel, on the
North-West Passage, where he
sailed to Lima, whence he ascended the high table-land of
Pasco, and descended thence by the eastern declivity of the
Andes to the valley of the Huancu or Huallaga, where he
remained nearly two years, during which time he collected a
great deal of information respecting the climate, productions, and
gography of that country. From the Huallaga he passed
down the river Maranon, and thence returned to Europe,
after five years (1827 to 1832) of wandering in the wilds of the
New World, laden with 17,000 specimens of dried
plants, some hundreds of insects, many plants before
unknown, 3,000 descriptions of plants, and many sketches.
His work is a most valuable addition to our knowledge of
South America.

Nearly simultaneously, namely from 1836 to 1832, an-
other extensive journey was accomplished by Alcide d'Orc-
higny, who travelled through the Banda Oriental, Patagonia,
La Plata, Chili, Peru, and Bolivia, and published a very full
account with many illustrations.

More important than the results of the great Surveying Expeditions of the Adventure and Beagle, 1825 to 1836,
commanded by captains King, Stokes, and Fitzroy. The
coast-surveys of this expedition were very extensive: in
addition to which it brought home a greater mass of accurate
geographical information than any of the former
voyages of Cook and Flinders. Very valuable collections in
all departments of natural history were made by Charles
Darwin, the naturalist of the expedition.

During the years 1836 to 1844 Sir Robert Schomburgk
explored British Guyana and the country to the west as far as
E
the Orinoco and Casiguané. In reaching the Upper Orinoco he was enabled to connect his observations with those of Humboldt; and thus the completed series of French points of equal terrestrial determination, along a line extending from the Atlantic to the Pacific. One of the most interesting of his discoveries is that of the water-line named Victoria Regia, the most beautiful specimen of the flora of the western rivers, which has successfully been brought to Europe, and has been an object of admiration during several years.

In the same region, and extending over the whole of Venezuela, Colonel Geddes, by order of the government of that country, completed surveys which were embodied in a valuable work and atlas, executed at Paris.

Prince Adalbert of Prussia has explored the Xingu and some other rivers and regions in the lower basin of the Amazon, and visited by any explored.

In the southern portion of the continent some interesting observations were made by Mr. Bentland in the elevated regions of the Titicaca Lake in 1827 and 1838. According to these observations the heights of the Sora and Illimani, situated to the east of the lake, were long given out to be greater than that of Chimborazo, and the highest peaks of South America, but it has since been found that the trigonometrical surveys of M. Pissis, a French engineer, that the alleged elevation of Illimani was about 300 feet too high, and Mr. Bentland's, on recalculating his observations, admitted this error, and found that the elevation of Sora had even been assumed by him 4000 feet too high.

W. Bollast and G. Smith, who since 1826 have been residing for a considerable time in the province of Tampaca, Peru, have made us acquainted with a very remarkable region of South America, a full account of which was published in 1834 by Mr. Bollast. In it the silver mines of the region along the coast, the Desert of Atacama in its deposits of nitrate of soda, salt, and other saline substances, and the Andes, have been well described. Mount Lirima, the highest peak of that portion of the Andes, is estimated at 29,000 feet, which, if correct, would place it above all other American mountains.

The provinces of La Plata have been well described by Sir Woodbine Parish, in a work published in 1839, of which a second edition, much enlarged, appeared early in 1839; and the French traveller Castélan, accompanied by the English naturalist Weddell, has since explored the little-known regions between the upper course of the Plata and the Peru-Bolivian table-land.

In the survey of the American coast, Sir Francis Bissett, Baron, in a behalf in the House of Commons, thus stated their progress in 1846:—'From the equator to Cape Horn, and from thence round to the river Plata, on the eastern side of America, all that is immediately wanted has been already accomplished, and the survey of Cove of Edinburgh.'

"Some parts of the great empire of Brazil we owe to the labours of Baron de Boussin and of other French officers; but there is much yet to be done on that coast between the Plata and the Amazon rivers, and again along Guayana and Venezeula up to the mouth of the Orinoco.

"The shores of the mainland between Trinidad Island and the Gulf of Mexico have been charted and published by the Admiralty; but many of the West India Islands are still wanting to complete a wholesome knowledge of those seas.

"The United States are carrying on an elaborate survey of their own coasts, and to the northward of them; a part of the Bay of Fundy has been done by ourselves, as well as all the shores of Nova Scotia, Canada, and Newfoundland; and if these surveys are finished, we shall only want to complete the eastern coast of America, those of Labrador, and of Hudson's Bay, which, being in our possession, ought to appear on our charts with some degree of truth."

Since 1845, Captain Kellett, in H.M.S. Herald, has continued the western coasts from the equator northward, along Central America, Mexico, part of California, and other regions, and has thus completed the entire western coast-line of America. The Americans advance steadily with the work of their charts.

Since the publication of the American armies many political changes have taken place in the governments of North and South America. The present names of the various states, with the area, population, and capital town of each, are stated in the following table—which however some of the figures are only approximations.
ANACNE

27

ANC

ANASTHETICS. [Materia Medica, S. 2.]

ANAPA, a sea-port town and fortress of Russian Cir-
ca, situated on the eastern shore of the Black Sea, in 44°
30' N. lat., 37° 16' E. long., 30 miles N. from the harbour
of Sevastopol, and about 30 miles S.E. from the mouth
of the Kaban; population, exclusive of the garrison, about
300. It was founded by the Turks in 1784, to protect
the Tartar subjects on the left bank of the Kaban, as also
to keep up their depredations on the Cossacks. It is the
principal town of the beach, which is 16" long., and 16"
wide, and 5 miles wide. It is the principal town of the
lands which are occupied by the Russians. There is no
harbour, but only a broad roadstead at Anapa. The imports
are cotton and woolen stuffs, rice, tamales, flour, salt, and
the exports are ox, buffalo, and cow hides; hare skins, furs,
tallow, w.c.

The fortress of Anapa is built on a projecting crag, the
most north-western extremity of the Caucasian Mountains.
The surface is smooth and slopes down in an extended plain
on the north and east towards the Kuban. The walls
which the sea are 425 yards long, and the entire circum-
ference exceeds 2 miles. To the south-west the walls are
built upon a calcareous rock, which rises 65 yards perpendi-
cularly. It was never captured, and which, on the side of
the northern side of the town, the white cliffs that line its
shore subsides. Some bastions and a ditch defend the for-
teness on the side of the plain. During the Turkish pos-
session the place, about one mile square, was in part
occupied by the fortifications and in part occupied by 200 shops,
coffee-houses, and cabins built of wood, hedges, and mud.
It was ill-built, irregularly laid out, and had a very turbulent
population; but it is said to have improved in every respect
since its capture.

A body of 8000 Russian troops was an unsuccessful
attempt to take Anapa in 1790; the next year it was
attacked by General Gudovich, though defended by
16,000 Turks and 16,000 mountaineers. It was soon after
reduced by Boccardo and Piedicimeno, and was taken in 1803,
and in 1809. It was again restored to Turkey by the treaty
of Bakharest. The Russians finally took Anapa, June 23,
1856, after an obstinate defence, and held it till the Russian
War 1854-5, when they were obliged to evacuate it; but they
have held it from that time.

ANAMERTA. [Materia Medica, S. 2.]

ANAS, the Duck, a genus of birds under which Linnéus
included a great number of species now separated into
several genera by recent naturalists. [Ducks.]

ANASTATIC, a genus of plants belonging to the natural
order Crucifera. One species, A: hierochuntina, the roes of Jericho. [Jeseco, Ross or.]

ANATHERUM, a genus of Grasses, belonging to the
family of the Gramineae: its species is the Anerum of the French, and the Huus of
the Flinders. Its fragrant roots are employed in making tatties,
cups for palumpanis, &c. It is administered medicinally,
and has stimulating and diaphoretic qualities. A. ranunculas
is also, as a source of the vegetable oil it contains, called Ginger-
lin, or Koobel.

ANCON-SALINA, a deep and extensive inlet on the
western coast of South America, situated between 50° 30'
and 25° 30' S. lat. and 37° 20' to 73° 40' W. long., is remarkable
for bordering the southern extremity of the Andes. The
Sonic enters into Smyth Sound, which separates the
Alsea Archipelago from the continent of America. It
penetrates by a very winding channel (40 miles long, and
from 5 to 10 miles wide) through the islands of the
Sonic, and expands at its eastern extremity into a large
sheet of water, called Kirke Water, which is 20 miles long
and 10 miles wide. From the channel several arms branch
north and south. The most western, which is called the
Gulf of the Pacific, is about 20 miles long. It is entered by
a narrow strait, the passage between which is nearly
Christmas this arm on the west is considered to be the southern
extremity of the Andes. From Kirke Water two deep

tides branch off. One of these, called Last Hope's Inlet,
extends northward and then north-westward, with a
distance of about 30 miles; the other, which
 terminates not far from the northern extremity of the
Fund of the Mountains, from which it is separated by a
high snow-capped range. The other, called Obstruction
Sound, runs southward for about 70 miles, and is from 8 to
6 miles wide. The western shores, both of Obstruction
Sound and of Last Hope's Inlet, are lined with high moun-
tains, in some places covered with perpetual snow, but
the greater part of their eastern shores, as well as the eastern
shores of Kirke Water, consists of level ground, which ex-

tends some distance inland, where only a few low hills and
some rising ground appear. It is therefore evident that the
Ancon-San-Dal is cut through the whole range of the moun-
tains, and terminate near the gulf of the Patagonia.

(Surviving Voyages of the Adventure and Beagle.)

ANCEON, a delegation or province in the States of the
Church, is bounded N. and W. by the province of Urbino,
and E. and S. by the Adriatic Sea. Its greatest length is about 38 miles, and the breadth is
about 16 miles. The area is 408 square miles, and the
population in 1843 numbered 166,114. The surface is
traversed by numerous offshoots of the Apennines, which
are separated by fertile valleys. If the rivers which are
small, the principal are—the Misa, the lower part of
which is in the province of Urbino-o-Pesar, and enters the
sea at Signigalia; the Eino, which has its source in the
province of Macerata; and the Musone, which forms the
boundary between the provinces. The whole area of the province is 280 (940,424) acres,
106,016 acres are under cultivation; 85,780 acres are covered
with plantations and copses, and the rest consist of olive-groves,
farms, meadows, natural pastures, etc., the whole
amount of absolutely barren land is only 296 acres.
The chief agricultural products are wheat, maize, hemp, hay,
tobacco, wine, oil, and beans. Some silk is also produced.
Sheep and hogs are reared in great numbers. There are
also many horned cattle.

The province comprises the northern part of ancient
Pisenum, with a small portion of Umbria; these two
provinces were separated by the Eelsis, now the Eino, which
river also formed the boundary between the Galli Senones
and Pisenum, and was therefore the northern limit of Italy
on the side of the Adriatic until this was afterwards
extended to the Rubicon. The province contains only a part
of the old Marches of Ancona, which formerly extended
from the duchy of Urbino on the north, to the Marches of
Fermo on the south, and to the Abruzzi on the east; other
towns which require notice here are Iesi and Osimo.

Iesi, 16 miles W. by S. from Ancona, near the left bank
of the Eino, and about 10 miles from its mouth, occupies
the site of the ancient Umbrian town Eelsis or Eelium,
which became a Roman colony, and was famous for its
cheese. It gives title to a bishop, and is a walled town
of considerable size, with a cathedral, five parish churches,
and several convents. Silk and woolen hosiery are manufactured.

Osimo, the ancient Auussinum, and a bishop's see, is
situated on a high hill in the midst of a beautiful and fertile
country, 8 miles S. from Ancona, on the road to Loreto, in 49° 31' 36" N. lat., 13° 27' 30" E. long.: population about 7000. It
is a healthy and well built place, with a cathedral dedicated

to St. Tecle; a town-house containing a museum of ancient
statues and inscriptions found in the neighborhood; a hand-
some episcopal palace; and several churches which contain
some good paintings. Auussinum, from the strength of its
position, was a place of importance in ancient times. The
Roman censors had walls built round it n.o. 174, and it
came a Roman colony n.o. 157.

In the great civil war the partisans of Pumpeius setded the
town n.o. 49, but the inhabitants refused to change
their allegiance to Caesars. Ancon became the capital of
Pisenum, of which it was always one of the strongholds.
Belisarius took it from the Goths after a long siege, during which it narrowly escaped
destruction. Under the Byzantine empire, Auussinum was one of the
of the empire in the Elesian Archipelago.

ANCUD, THE GULF OF, extends between the mainlands
of South America and the island of Chiloe, from 41° 30'
to 43° 30' S. lat., and from 72° 40' to 73° 80' W. long. It
comprises the narrow winding strait of the Narrows of Chaco, which are of considerable depth, but at
some places hardly a mile wide. On the south of the
island of Chiloe it is connected with the Pacific by the wide
opening which occurs between the Chonos Archipelago and the
island of Chiloe, which is about 20 miles long, and about 150 miles wide (including its expansion towards the north,
which is called Reloncavi Sound), and at an average 60 miles
wide. Its shores are everywhere high, and formed by rocks.
ANG

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In the middle of the gulf, between 42° 10' and 43° 50', are a great number of high rocky islands and islets. The southern part of the Bay of Arcos is in some maps named the Gulf of Covarrubias. (Surveying Voyages of the Adventure and Beagle)

ANGLESEY, HENRY WILLIAM PAGET, MARQUIS OF, eldest son of Henry, first Earl of Uxbridge, was born May 17, 1792, and educated at Charterhouse School and Christchurch, Oxford; and entered Parliament as member for the Caernarvon boroughs in 1790. His predilection was however for a military life, and it found free scope at the outbreak of the revolutionary war in 1793, when he eagerly set to work to help his father’s cause. He joined at first the Staffordshire Volunteers, but which was admitted into the establishment as the 80th foot. Of this regiment he was appointed lieutenant-colonel on its having made up its complement of 1000 men. At the same time he received a commission to the rank of major in Sir Henry Erskine’s regiment of the Guards, and on being transferred to the command of a cavalry regiment, and commenced the career which at no distant day caused him to be regarded as the first cavalry officer in the service. As commander of the cavalry he accompanied the Duke of York into Holland, and although in no respect distinguished himself, he had few opportunities of acquiring distinction, but in the general attack Lord Paget succeeded in defeating a much superior body of the enemy’s cavalry; and in the retreat, where he occupied the rear, he gained a signal triumph over a much larger force advancing to the rear. In 1806, he was appointed to the command of the cavalry of the 3rd division, which he maintained at home diligently occupied in training the regiment of which he was colonel, and in carrying out the system of cavalry evolutions which he had introduced, until near the end of 1808, when, having previously been made major-general, he was sent into Spain with two brigades of cavalry to join the army of Sir John Moore. In forming this junction General Paget was perfectly successful, and on the road he succeeded in cutting off a party of French posted at Rueda—three thousand men altogether. After that battle he attacked the French in Spain. On joining Sir John Moore the cavalry under Lord Paget was pushed forward, and on the same day, December 20, came up with a superior body of French cavalry, and defeated it, taking above 120 prisoners, including two lieutenant-colonels. These victories gave the English cavalry an amount of confidence in themselves and their commander, which in the subsequent retreat was of the utmost value. During the retreat Lord Paget with his cavalry formed the rearguard of the French infantry and artillery, and on quitting Benevento he received intelligence that the enemy had arrived, and that their cavalry were crossing the Esla. Lord Paget hastened to the ford, and directed the 10th Hussars under General Stewart to charge the Imperial Guard, who had crossed. The French were driven back with a considerable loss in killed, wounded, and prisoners, among the latter being General Lefebvre Desnoeux, commander of the Imperial Guard. At the battle of Corunna Lord Paget had the command of the reserve, and his charge in support of the right wing, which was menaced by a far superior force, decided the fortune of the day.

Lord Paget returned to England in 1809, and did not again serve abroad during the Peninsular war. In 1810 he was divorced from his first wife, by whom he had had eight children. Soon after the divorce Lady Paget married the Duke of Argyll, and Lord Paget married Lady Cowley, who had just been divorced from Lord Cowley. In 1812 he succeeded, by the death of his father, to the title of Earl of Uxbridge.

In the early part of 1815 the Earl of Uxbridge commanded the troops collected in London for the suppression of the corn-law riots; but a more important service soon devolved upon him. When Napoleon escaped from Elba, and startled Europe by his re-appearance on the imperial crown, the armies of the allied sovereigns were at once set in motion against him. The Earl of Uxbridge was appointed commander of the cavalry of the English army, and his management of this branch of service excited general admiration. At the battle of Waterloo he fell mortally wounded; but as his command was conspicuous amidst the almost unspeakable gallantry of which that field was the theatre. It was the final charge of the heavy brigade, led by the earl, that destroyed the famous French Guard, and to that the hopes of the emperor. Almost at the close of the battle a shot struck the earl on the knee, and it was found necessary to amputate his leg. The limb was buried in a garden by the field of battle, and some sentimental Belgian admirers erected a monument in commemorating the circumstance, which is always one of the objects shown to visitors to Waterloo. The service rendered by the earl at Waterloo was generally recognized and duly rewarded. Immediately the dispatches of the commanders-in-chief were received in the name of his majesty, the dignity of Marquis of Anglesey, and nominated a Knight Grand Cross of the Order of the Bath; while he received from the emperors of Austria and Russia, and other European sovereigns, corresponding knighthoods.

In 1819 he was elected to succeed his father as minister of the home department, and continued to hold the full rank of general; at the coronation of George IV. he held the office of Lord High Steward of England; and in 1820 received the sinecure offices of Captain of Cowes Castle.

When Canning became prime minister in April 1827, the Marquis of Anglesey formed one of his cabinet, having succeeded the Duke of Wellington as Master-General of the Ordnance; but this office he resigned in the following spring to become, under the ministry of the Duke of Wellington, Lord Lieutenant of Ireland. The duties of this important station the marquis addressed himself with characteristic energy, and by his zeal, impartiality, and ardent temperament, won a remarkable share of popularity. But his earlom estran his discretion. He had already in conversation expressed the opinion that the duty of carrying the peace of the kingdom would be better performed by a nobleman than by a soldier, and found to be inconvenient; and when, in December 1826, he wrote a letter to the Roman Catholic primates directly favorable to Roman Catholic emancipation, he was at once recalled. The day of his departure from Ireland the works in process of construction there were opened, business was suspended, and his embarkation was attended by large numbers of all classes of the citizens. In the House of Lords the marquis was a warm advocate of the measure which his letter of March 1827, written in reply to Canning’s letter, and addressed as the cause of the ministerial break-up, also quitted office. Of the thorough honesty of purpose of the marquis’s administration of his vice-regal functions, after the temporary triumphs against Napoleon, he had been the most conspicuous, and nothing but the most extraordinary public spirit can have induced him to surrender any high order of statesmanship there can be no pretension raised. The institution by which his tenure of office is most likely to be remembered is the Irish Board of Education, which was originated and carefully fostered by him, and for whose establishment he succeeded the greatest benefits conferred on Ireland in recent years.

From this time the marquis took little part in public affairs until the formation of the administration of Lord John Russell in July, 1846, when he again became MasterGeneral of the Ordnance; the duties of which office he sedulously performed till February, 1852, when the Russell ministry was replaced by that of Lord Derby. He was made colonel of the Horse-Guards in 1842, and was advanced to the dignity of field-marshall in 1845. He died full of years and honours April 29, 1854. By his first wife the Marquis of Anglesey had issue two sons and six daughters; by his second wife he had six sons and four daughters. He was succeeded in his title, and as lord-lieutenant of Anglesey, by his eldest son, the present marquis.

ANGOULÉME, DUC AND DUCHESSE D', Louis Antoine de Bourbon, Duc d'Angouléme, and afterwards Dauphin of France, the son of the Comte d'Artois (afterwards king by the marriage-in-chief of the Austrian imperial archduchess, X.), was born at Versailles on the 6th of August, 1775, and died at Götitz on the 3rd of June, 1844. He was fourteen years of age when the revolution broke out. The Comte d'Artois in order to protect by his absence those concessions which he had made to the revolutionists, offered to marry one of his two sons followed him to Turin, the court of their grandfather, where for some time they devoted themselves to the military sciences. In 1792 the young duke received a commission in Germany, but attained no distinction. The ill success of this campaign induced him to return to a state
In the north, on which side it is defended by a massive wall flanked with numerous towers. The towers are remarkable for the gigantic cisterns formed by huge blocks of red sandstone let into the masonry. The walls, towers, and churches are in good preservation; so much so, that at a distance the city does not seem deserted. Besides the buildings the public buildings display much elegance and architectural beauty, and the fritework of the arches is very rich. Some of the churches are decorated with rude wall-paintings representing scriptural and legendary subjects. There are a few Turkish houses, but some are Turkish. The private houses of Ann are supposed to have been of an humble description, as none of them are left standing, and the whole area on which they stood is covered merely with mounds of loose stones. The city continued to be inhabited till a.d. 1818, when its ruin was completed by an earthquake. (Wilbrahim’s Travels in the Trans-Caucasian Provinces of Russia.)

ANTHOPODES, the name given to Human Fossil Remains. At one time it was thought that human remains were often found fossilised, the investigations of modern anatomists have shown that in most of these cases the supposition is false. Daubenton first demonstrated that some bones which had long been regarded in Paris as human, were of the domestic fowl; and the same tribe of beings. The researches of Cuvier gave a clue by which all cases might be tested, and most of the earlier instances brought forward have been referred to their correct types. Human fossil bones have, however, been discovered in the
Belgian bone-caverns, with bears, rodents, &c., and are figured by Dr. Schmerling, in his interesting work on the bones found in a cavern near Liège.

Dr. Buckland ('Bridgewater Treatise') remarks that frequent discoveries have been made of human bones and rude works of art in natural caverns, sometimes inclosed in stalactite, at other times in beds of earthy materials, which are interspersed with bones of extinct species of quadrupeds.

These cases, he thinks, may be explained by the common practice of mankind in all ages to bury their dead in such caverns. "The practice of burying in caverns continues," says Dr. Buckland, "that many caverns contained the bones of extinct species of other animals, dispersed through the same soil in which human bodies may, at any subsequent period, have been buried, affords no proof of the time with which they were interred. Many of these caverns have been inhabited by savage tribes, who, for convenience of occupation, have repeatedly disturbed portions of soil in which their predecessors may have been buried. Such disturbances will explain the occasional admixture of fragments of human skeletons and the bones of modern quadrupeds with those of extinct species introduced at more early periods and by natural causes. Several accounts have been published within the last few years of human remains discovered by miners of France and Belgium in parts of the province of Liège, which are described as being of the same antiquity with the bones of hyaenas and other extinct quadrupeds that accompany them. Most of these may probably admit of explanation by reference to the causes just enumerated. In some cases, however, it is certain that the caverns, in which form bones of elephants, rivers, or which are subject to occasional inundations, another cause of the admixture of human bones with the remains of animals of more ancient date may be found in the movements occasioned by running water."

The same learned author observes that the most remarkable and only recorded case of human skeletons imbedded in a solid limestone rock is that on the shore of Guadaloupe, adding that there is, however, no reason to consider these bones as of any antiquity, as the circumstance which occurs is of very recent formation, and is composed of agglutinated fragments of shells and corals which inhabit the adjacent water. Such kind of stone is frequently formed in a few years from sand-banks composed of similar materials, on the shores of tropical seas."

antimony. [Chemistry, S. 1.]

ANTOMMARCI, FRANCESCO, a surgeon of some repute as an anatomist, but more likely to be remembered in the year 1836, when on the appointment to Napoleon, at St. Helena, he was the first to be the architect of Antommarchi's versai; it was affirmed that he had unlawfully assumed the title of professor, and that nobody had been able to find two works that he had published—the one a treatise on the cholera, the other a commentary on the subject of phrenology, in their spineless adored, so far as to throw a suspicion upon the identity of the cast considered with regard to the material. 'Your cast,' they said to him, 'is of a fine plaster; it is white and pure, as such is only to be seen at London, where being formed of it, you could not have found any such at St. Helena.' Wearing with all these vexations, Antommarchi about 1836 took the desperate step of emigrating, in order to practise homoeopathically at New Orleans, and afterwards at Havanna." He died at St. Antonio in Cuba, about 1844.

ANTUS, DISEASES OF. [Surgery, S. 2.]

AORTA, DISEASES OF. [Surgery, S. 2.]

APIN, [Chemistry & S. 1.]

APHORISMS. [Chemistry, S. 1.]

APPYLOCIC ACID. [Chemistry, S. 1.]

APPPEY, CHARLES JAMES, a writer on sporting subjects of considerable reputation, better known by the pen-name of "Damoiselle Callot," he was the second son of Thomas Apperley, a Welsh country gentleman, and was born in his father's seat of Pilgrownen, in Denbighshire, in the year 1777. At Rugby school he acquired some knowledge of the classical languages, and much more of the sports of the field. In 1801 he married the daughter of William Wynne, Esq., and in 1804 he took up his residence at Bilston Hall, once the county seat of Addison, in Warwickshire. Here he devoted himself so entirely to the chase that for some years his only pursuit was that of a fox-hunter. He often rode thirty or forty miles in a day, without much regard to the expenses of the sport by disposing of hunters, after he had ridden them for some time, to those of his friends whose knowledge of the horse was not so intimate as his, and who therefore could not estimate the value of such a purchase of an unridden animal. In 1821 he removed into Hampshire, and commenced farming on a large scale; and in the same year he began to write for the press. His contributions to the 'Sporting Magazine,' especially his Hunting Tours, and his elegant descriptions of various places of interest. His style was that of a well-bred gentleman; and the circulation of the work was doubled in two years; and Mr. Pitman, the proprietor of the magazine, not only remunerated him handsomely, but also paid the expenses of his tours, and kept for him a stud of horses, which formed the most splendid collection of foals that ever was exhibited. After his death, owing to the circumstances mentioned above, the result of which was that, to avoid a prison at home, Nimrod was compelled to take up his residence in France. In
APT

AQUARIUM, a contraction for *Aquaria vivarium*, a term applied to arrangements of living aquatic animals and plants inhabiting either fresh or salt water. Although it has been known from the earliest times that animals living in water may be kept in glass vessels for exhibition by the daily supply of fresh-water, the discovery and adoption of modern chemistry have pointed out how animals may be kept living in only limited quantities of water which never demand renewing. The possibility of accomplishing this depends on the animal which can thus be kept in chemically pure water, and vegetable kingdoms. The one set of these beings are engaged in giving off what the other requires, and in taking up what the other rejects. It is thus that the carbonic acid which is thrown off from the tissues of animals is taken up by water plants, and oxygen is supplied from the atmosphere; whilst the plant gives off oxygen gas, and supplies the atmosphere with this element of its composition which is necessary to the life of animals. The relations which are thus found to exist on the large scale of the whole surface of the earth, are found also to occur in a jar of water. If an animal is placed in pure water it quickly exhausts the oxygen it contains, and gives out into it carbonic acid gas; the consequence is, that it dies. But if we place with the animal some plants which live in water, and which in the carbonic acid given out by the animal will be taken up by the plant, and that the plant will give out oxygen in its place. Thus the water becomes cleared of its injurious compound, and the needed element, oxygen, is supplied. Such an arrangement is on a small scale to be considered. The first experiments were made with fresh-water by Mr. N. B. Ward, and one of the earliest accounts of such an arrangement was given by Mr. Warington, chemist to the Apothecaries' Company. The latter found out, however, that it was not necessary to have a living specimen, as it has been exhibited in the gardens of the Zoological Society, Regent's Park. Of all birds at present known the Aepyornis appears to have the wings the most reduced to their simplest elements. Its general form is that of the Penguin, and in so far it is seldom quite so big as our common goose. The beak is very long and slender, marked on each side with a longitudinal groove, and covered with a membrane at its base. It differs from other birds in the completeness of its diaphragm, and in the absence of abdominal air-cells. The bones are not hollow, as is mostly the case in birds; the sternum is very small, and the ribs are extraordinarily broad; the feathers have no accessory plumes, and their shafts are prolonged beyond the back; the feet have a short and elevated hind-toe, of which the claw alone is externally visible. The native name of this bird is Kiwai-Kiwi, given it on account of its peculiar cry. It is a nocturnal bird, and preys on mallards, insects, and worms. Whilst at rest it has the singular habit of resting upon the tip of its bill, which is its only characteristic position.

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APTENODYTES. [Penguins.]

APTERYX, a genus of Struthious Birds, inhabiting Australia and the islands of New Zealand. It was first described by Dr. Shaw, who regarded it as an extinct form of bird. It evidently belongs to a group of birds that were destined to be on the earth, only as long as they were free from the attacks of carnivorous enemies endowed with greater powers of detection than themselves. Members of wingsless birds, not belonging to the Struthious division, as the Dodo and Solitaire, seem already to have become extinct; whilst the smaller species of the *Dinornis* are suffering in like manner. The Aepyornis is not however extinct, as many stuffed specimens are in the British Museum, and a living specimen has been exhibited in the gardens of the Zoological Society, Regent's Park. Of all birds at present known the Aepyornis appears to have the wings the most reduced to their simplest elements. Its general form is that of the Penguin, and in so far it is seldom quite so big as our common goose. The beak is very long and slender, marked on each side with a longitudinal groove, and covered with a membrane at its base. It differs from other birds in the completeness of its diaphragm, and in the absence of abdominal air-cells. The bones are not hollow, as is mostly the case in birds; the sternum is very small, and the ribs are extraordinarily broad; the feathers have no accessory plumes, and their shafts are prolonged beyond the back; the feet have a short and elevated hind-toe, of which the claw alone is externally visible. The native name of this bird is Kiwai-Kiwi, given it on account of its peculiar cry. It is a nocturnal bird, and preys on mallards, insects, and worms. Whilst at rest it has the singular habit of resting upon the tip of its bill, which is its only characteristic position.

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APTERYX, a genus of Struthious Birds, inhabiting Australia and the islands of New Zealand. It was first described by Dr. Shaw, who regarded it as an extinct form of bird. It evidently belongs to a group of birds that were destined to be on the earth, only as long as they were free from the attacks of carnivorous enemies endowed with greater powers of detection than themselves. Members of wingsless birds, not belonging to the Struthious division, as the Dodo and Solitaire, seem already to have become extinct; whilst the smaller species of the *Dinornis* are suffering in like manner. The Aepyornis is not however extinct, as many stuffed specimens are in the British Museum, and a living specimen has been exhibited in the gardens of the Zoological Society, Regent's Park. Of all birds at present known the Aepyornis appears to have the wings the most reduced to their simplest elements. Its general form is that of the Penguin, and in so far it is seldom quite so big as our common goose. The beak is very long and slender, marked on each side with a longitudinal groove, and covered with a membrane at its base. It differs from other birds in the completeness of its diaphragm, and in the absence of abdominal air-cells. The bones are not hollow, as is mostly the case in birds; the sternum is very small, and the ribs are extraordinarily broad; the feathers have no accessory plumes, and their shafts are prolonged beyond the back; the feet have a short and elevated hind-toe, of which the claw alone is externally visible. The native name of this bird is Kiwai-Kiwi, given it on account of its peculiar cry. It is a nocturnal bird, and preys on mallards, insects, and worms. Whilst at rest it has the singular habit of resting upon the tip of its bill, which is its only characteristic position.
of this paradeogram are bounded by reservoirs of plate-glass, each being about 6 feet in length and 2 feet 6 inches in depth. These are held in position by a projecting base resembling the ground, so that each division presents as it were a submarine picture 'on the line,' and may be approached so closely that the minutest animals not microscopic, may be watched with the most perfect success, under circumstances which in reality are of nature.

The whole of these tanks are supplied with gravel, sand, rocks, and sea-weed, so as to imitate the rock-pools left on the seashore by a receding tide, which indeed they may be said to represent; for they have the greatest advantage to the observer that lies in looking vertically into a cavity in which the light becomes less and less in proportion to the depth, he has here the means of examining each animal in its turn, under an effect which is not only most delightful in itself, but this being seen in section through an artificially transparent wall, affords the best possible position for investigating the structure and functions of the living beings contained in it.

The tanks contain fresh-water animals and marine animals. The fresh-water tanks present all the more common species of British Fishes, as the Pike, Tench, Perch, Roach, Rudd, Carp, Eel, Stickleback, Minnow, Gudgeon, etc. Some of the larger forms of fresh-water Crucates, as the Crawlifish, have also been introduced. With the Stickleback a large variety of the fresh-water Mollusca, belonging to the genera Lymnaea, Planorbis, Anodonta, Unio, &c. These tanks have been occupied since Christmas, 1852, with scarcely any loss.

Amongst the Radiate Animals none are more remarkable for their size and beauty than the Scutarian Zoophytes and the Polyzoa are also there, but their animal inhabitants are too minute to be seen with the naked eye. Specimens of the Echinoderma, including several forms of Star-Fishes (Asteroidea), the star Limpets, Sea-Snails, etc. of an equal size, are also represented. The other rare forms of this class of animals have been from time to time introduced.

As was to be expected, the Mollusca thrive. In the sea they play the same part as in the fresh-water : they are the scavengers of the ocean. The Pinna, the Oyster, the Pecten, the Cockle, amongst bivalves; and the Whelk, the Periwinkle, with many other molluscs, have demonstrated how large a field of observation is in store for those who study the Mollusca, as well as the forms of the animal kingdom. The Nudibranchiate Mollusca, those forms and colours are only known to us through the great work of Alder and Hancock, have been successfully kept alive; whilst the red leaves of the species of Rhodophyta have been kept in exciting health for several years. The eggs of Mollusca have lived, and complete the evidence that this great group of animals may he watched in their living habits as easily as their shells may be examined in a cabinet.

Most of the Articulata have been represented in these tanks by species of Lobster, Crab, Shrimp, and Prawn. Though many of these are inhabitants of the deep sea, and only reward the labour of the dredger, yet they live perfectly well in the shallow lodges provided for them by the Zoological Society. These facts demonstrate that amongst the Invertebrate tribes there are none whose habits may not be studied in the Aquarium.

With regard to fish it is found that those which live in streams thrive best in the Aquarium. The Cork-Wing (Cernbubrus Cornucibix), the Fifteen-spined Stickleback, the Long-spined Cottus, two species of Benny, the Goby, the Grey Mullet, and the Flat Fish have lived remarkably well.

Anchovies, May 25, 1853; Rounds. May 28, 1853; Annals of Natural History, May, 1853; Goose, A Naturalist's Ramble on the Devonshire Coast; Dalvay, Remarkable Animals of Scotland; Lancaster, The Aquarivarium.

ARABGIR, a town of Asia Minor, in the pashalik of Sivas, is situated on an elevated plateau between the Gil-Dagh and Sari-Chi-Chak branches of the Anti-Taurus [Anatolia]; at a distance of 16 miles N.W. from the junction of the Kara-Sin and Murad-Su, on the caravan route from Aleppo to Trabzon, from which places respectively it is distant 270 and 198 miles. It is built amidst a forest of fruit-trees, among which the White Mulberry is most common. The water of the mulberry is sweet, fresh, or brackish, according as it be brandy, or it is made into a sweetmeat called Petmes, which is common all through Armenia. The soil in the neighbour-

hood where it is free from rocks yields fine crops of wheat. The snow begins to fall in December, and the place lies in a snow climate. The town contains 4800 Turkish and 1260 Armenians.

A few years ago the Armenian population had 1000 hand-locks at work, weaving cotton goods from British yarn. This industry and the caravan trade rendered Aragib a thriving place, but the land is now so barren, iron ore is abundant; and near the spot where the above-named river meets and form the Euphrates, are the lead and copper-mines of Kaban-Maden. (Royal Geog. Soc.)

ARAGO, FRANÇOIS JEAN DOMINIQUE, was born in the commune of Estagel, near Perpignan, province of Rousillon (now the department of the Eastern Pyrenees), on the 20th of February, 1786. His father, a licentiate in law, supported his numerous family on the income derived from a small landed property, acquired the rudiments of reading, writing, and vocal music at the primary school of his native place, and in private lessons at home. He became an eager reader, and at an early age conceived a taste for scientific life, and nourished by the continual passing of troops on the march to or from the frontiers of Spain. When but seven years old he attacked with a lance the leader of a few Spanish troopers who had ridden by mistake into the village after a battle, and was only saved from injury by a lucky chance. At the age of thirteen, all he thought of was study and study—six hours a day, and four hours a night. He had been appointed Treasurer of the Mint in Perpignan, the family removed to that town, where he was entered as a cadet at the Musée de l'Armée, and pursuing his literary studies, made himself acquainted with the celebrated author of his native country. But walking one day on the ramparts, a little incident occurred that confirmed his military inclinations. Seeing a youthful officer directing the repairs of the fortifications, Arago was surprised to see the man of twelve,

though he was not exactly a washerman, be familiarised himself with the writings of Legendre, Lacroix, and Garnier. His real master, to quote a passage from his autobiography, was a cover of Garnier's 'Treatise of Topography;' and he soon mastered the elements of this branch of study stood alone, at the time, as a branch of study, and was answered—By study at the Polytechnic School, which was open to those who had passed a preliminary examination. From that time Arago, then in his twelfth year, betook himself to the study of mathematics and geometry, not in elementary manuals, but in the original works of the best authors, and mastered their contents with characteristic energy. He soon outstripped the whole who taught mathematics, and was only surprised by the unexpected testimony of a neighbouring proprietor, who was a military man, be familiarised himself with the writings of Legendre, Lacroix, and Garnier. His real master, to quote a passage from his autobiography, "was a cover of Garnier's 'Treatise of Topography;' and he soon mastered the elements of this branch of study

in eight months Arago was ready in the examinations, but the examiner having been detained by illness, a delay occurred, during which his friends sought to divert him from the pursuit he had chosen. He kept on, however, and studied the works of Euler and Laplace, and took lessons in fencing and dancing, having heard the story of these accomplishments from an officer of the name of Petmez. As he was examined by Monge at the University of Toulouse, and passed with high commendations first of his class. He repaired forthwith to Paris, and entered the Polytechnic School, after a few months, he was summoned hastily from an examination by Legendre as follows at that from Toulouse. In either case, his readiness and familiarity with the subjects required, overcame the prejudices of the examiner.

He was studying for the artillery branch of the service when, in 1804, he post of Secretary to the Observatory
at Paris, then under Bouvard's direction, having fallen vacant, he was persuaded, but with great reluctance on his part, to undertake the duties. The temporary appointment, as he thought it, effected an entire change in his pursuits, for he remained attached to the Observatory for the rest of his life. At the instance of Laplace he worked with Biot, who was assistant-observer, at experimental researches for determining the refractive power of different gases—an inquiry connected with the results of which formed the subject of a paper presented to the Academy and printed in their "Memoirs" for 1806. In the same year the two young men were appointed by the government to extend and complete the measurements of the arc of the meridian, at Beijing. It was found, under the superintendence of Delambre and Méchain, had been interrupted by the death of the latter. It was now to be extended from Barcelona to the Balearic Isles, and thence to Fontenay, by an immense triangle, the measurement of which had been thought impossible. The fatigues of this survey in a wild mountain region, exposed to heat, cold, and storm, were excessive. For six months Arago was stationed on an elevated peak in the Deserti de las Palmas, watching for the light on up on Ivis, which, owing to a defect in fixing the cross lines, was not discovered. On the summit of the fire square yards was all the ground he had for exercises; and two Carthusian monks, who, forgetting their vow of silence, used to ascend the mountain to converse with him in the twilight hours, the frequent journeys, in which, apart from the fierce heats, much risk was incurred owing to the hostile feeling between France and Spain, and from parties of brigands. On two occasions a notorious robber-chief intruded himself as a sightseer into the camp.

The geodetical union from the mainland to Ivica, and thence to Fontenay—an arc of parallel of one degree and a half in one triangle—was successfully accomplished. Biot had returned to Paris, when, in the summer of 1806, the first expedition on Mount Galazzo, for mapping the Swabian Alps, was sent under the command of Arago. For his advice, which demonstrated itself not only in the execution of the survey itself, but in the arrangement of the apparatus in the camp, and Arago was denounced as a spy. To escape the threatened violence, he obtained permission from the governor to appoint himself in the island of Bler. Having a safety-pass from the English Admiralty, he escaped in a half-decked boat to Algiers in July. In August he sailed for France in an Algerine frigate, and was in sight of the coast of Provence when the vessel was captured by a Spanish privateer, and carried into Roads. Here he was again exposed to great danger: the authorities, bitterly suspicious, subjected him to repeated examinations, and consigned him to the hulks at Palamos, where his sufferings from want of food were, as he tells us, aggravated by the sight of the Pyrenees, and the thought of his祖国. He would then be looking up at their peaks, anxious for her.

Being liberated on demand of the day, he sailed once more for France on September 25, and was off the port of Marseille when the cock crowed, caught by the nurse, was drafted away for the Mediterranean to the coast of Africa. Arago landed at Boogie, and having travelled to Algiers, found a new day in power, who would have sent him to the galley but for consular interference. Here he lingered, waiting for an opportunity to return home, until June, 1809, when he again sailed, and though chased by an English cruiser, landed at Marseille on the 2nd of July, with his manuscripts and instruments. For eleven months he had been tossed about amid hardships and privations, of all of which he has left an interesting account in his "L'Histoire de ma Jeunesse."

While yet in the lazaretto, he received a letter from Humboldt—the commencement of a lasting friendship with the illustrious Prussian. Tenderness attached to him; mother's first visit was to her at Pargimgan. She had mourned him as dead.

Arago hastened to Paris to communicate his observations to the Academy and the Bureau des Longitudes. Though let to his works in poverty, and exposed to the world's contempt and suspicion by his labors and misfortunes; and the death of Lalande having left a vacancy in the Academy, he was elected a member by 47 out of 80 votes on the 17th of September, and from that time honored with the usual presentation to the Emperor. Thereafter, he was admitted into a learned body; and his opposition to unworthy candidates brought him at times into collision with some of the most eminent of his colleagues. Before the close of 1809 he was appointed assistant-astronomer to the Observatory, and to succeed Monge in the chair of analytical mathematics at the Polytechnic School.

In 1811, taking up the researches in Mains, he read a paper to the Academy in which knowledge of the laws of light was greatly extended, and the changes described that take place in polarised rays on passing through different kinds of crystalline plates. The phenomena of colour, of intensity, of rotation, and of reflection, were examined, and by a new and original mode of effecting the experiments. One of the most interesting results was the discovery of the effect of an opaque medium, as the atmosphere when the sky is clouded; the polarised light varies with the height and position of the point with respect to the sun.
current. He proved moreover the best magnet to be a steel bar inclosed by a helix of copper-wire, to which we owe the discovery of the electro-magnet, and all that has since been accomplished thereby. Four years later other facts were also proved; and it was shown that not magnetism alone exert a powerful influence on the magnetic needle, particularly when in motion. Such metals appeared to become magnetic by mechanical motion—a phenomenon which has since been referred by Faraday to general laws of mechanical induction.

In 1829 Arago was chosen a member of the Bureau des Longitudes, and from 1834 till his death the \textquoteleft Annuaire', published by the board, contained a notice on some scientific subjects of general interest, as well as on others. \textquoteleft They were always to be republished,' says M. Combes, president of the academy, \textquoteleft with the same pleasure by men of science and by the ordinary reader. In them we find an admirable clearness, with an erudition as correct as it is extensive, and joined thereto the most rigorous accuracy in the statement of the phenomena, and the consequences which result from them.'

Arago won the position and honour he most prized in 1830, when on the death of Fourier he was elected perpetual secretary of the academy. And now the duty devolved upon him of writing those \textquoteleft d\oeuvres' of deceased members which are among the most interesting of his literary productions—graceful in style, and abundant in anecdote and illustration. They appeared to be written with a fluent pen; but it is this power, and only this, which implies expression of expression by real and repeated hard work of mind and hand. In the same year he was appointed director of the Observatory.

In 1834 Arago visited England a second time, and attended the meeting of the British Association at Edinburgh. He continued his scientific researches, among which are—the discovery of a neutral point in the polarisation of the atmosphere—determination of the neutral points of the magnetic needle at places widely apart, by observations carried on simultaneously with Kupffer at Kassel—and the suggestion of a decisive proof of the truth of the undulatory theory, which has since been demonstrated by Foucault—besides other points of photometry and astronomy.

The later years of Arago's life were passed amid much bodily suffering, when, with failing sight and afflicted with diabetes, he set himself to finish his incomplete papers. In the summer of 1853 he went, attended by his niece, to his native place, seeking relief in change of air; but the hope was disappointed: he returned to Paris and died on the 2nd of October, aged 67. He was buried in the cemetery of Père-la-Chaise, followed by a concelebration of 3000 persons to the grave, where Flourens pronounced the funeral oration.

Arago was a member of the Royal Society in 1818. In 1825 their Copley medal was awarded to him for his \textquoteleft discovery of the magnetic properties of substances not containing iron'; and their Rumford medal in 1850, for his \textquoteleft experimental investigations of polarised light.' The Royal Astronomical Society elected him one of their associates in 1822; he was also a member of some of the leading scientific societies on the continent. Arago was once married: his wife died in 1820, leaving two sons, who still survive. He had been accused of boarding up wealth, but he left no other fortune to his relatives than a name and reputation of which they may he justly proud. His entire works are easily accessible, as they have been collected and published in a series of octavo volumes in French and English. It is said that he has left a narrative of his later years, not less interesting than that to which reference has been made above, for publication when the fitting time shall arrive.

National vanity and an impassioned nature at times involved Arago in bitter controversies with other savants, in which he too often lost sight of truth and justice. It is certain also that he was occasionally tempted to sacrifice accuracy to effect. In politics he was an ardent republican, to which he was led by his devotion to the character of Deputies after the \textquoteleft Three Days' of July, 1830. By his eloquent advocacy the observatory of Paris was placed on its proper footing among the observatories of Europe, and the works of Laplace and Fermat were published at the national expense. His communications in favour of science. To his residence at Claro, the Italian philosopher, owed his return to Naples from a wearisome exile. In 1840 he became a member of the Council-General of the Seine; and in 1848 he was chosen into the Provisional Government, in which he discharged the functions of minister of war and marine. In bitterness of spirit he deplored the failure of the republic on witnessing the popular caprice. He refused to take the oath of allegiance after the coup-d'état of 1851, and justified his refusal in a memorable letter to the government, which elicited a concession alike gratifying to his conscience as a politician and his dignity as a philosopher. \textquoteleft A special exception,' so wrote the minister authorised by the Prince-President, \textquoteleft would be made in favor of a philosopher whose labours had rendered France renowned, and whose existence the government would be loth to sadden.'

ARAGUAUYA, one of the largest and most important rivers in the interior of Brazil, though up to the present time it is not much navigated, because the countries along its banks are unproductive, except at a few isolated places. It divides the province of Goyas, which lies east of it, from Mato Grosso, which extends west of its course. It rises in the Serra de Santa Martha, south of 18° S. lat. in a lake, and runs under the name of Cayapo about 160 miles, when it unites with the Rio Claro, which traverses the town of Villa Boa de the capital Goyas, and takes the name of Araguauy. Continuing in a northern direction to about 18° 30' S. lat., the river divides into two branches, which do not reunite until 9° 30'. The island which is thus formed is called Ilha de Santa Anna. It is more than 200 miles long, and at an average of 30 miles wide, so that it covers a surface of more than 6000 square miles. The western arm of the river preserves the name of Araguauy, whilst the eastern is called Furo. The latter is most used by the inhabitants of the town of Pará, and at a very few places on its shores the Portuguese settlers have formed establishments, whilst none exist on the western arm. In both arms some falls occur, but they are not considerable. After its arms have re-united, the river runs to 6° S. lat., where it joins the Tocantins. The whole course of the river probably does not fall much short of 1000 miles, and it receives the waters of several navigable tributaries south of 10° S. lat., among which the Vermelho and Crixia from the right, and the Rio das Mortes and San João from the left, are the largest. (Henderson's \textit{History of Brazil}).

ARANEIDE, the first family of the first order of the class Arachnidea. \textquoteleft\textit{Arachnida}.' They are also called \textit{Spinipeda}, from their peculiar habit of bearing long filamentous cords with which they form their nests and webs. It is to this family that the term \textit{Spider} is more especially applied; and scientifically it embraces all those creatures which are commonly called Spiders. All these are equipped under the old Linnaean name of Araneida. Externally this family is distinguished by the following characters:—The palpi resemble small feet without a claw at the tip, terminated at most in the females by a small hook, but in the males supporting various appendages, more or less complicated, connected with the function of reproduction in this family. The frontal claws are terminated by a moveable hook which curves downwardwards, and has on its under-side a little slit for the emission of a poisonous fluid which is secreted in a gland below the preceding joint. The maxillae are never more than two in number; the tongue is of a single piece, always external, and situated between the maxillae, and more or less square, triangular, or semicircular.

The thorax has upon it a V-like impression indicating the region of the head; it consists of a single piece, to which is attached behind a moveable and soft abdomen. This part of
the body is furnished with four or six nipples, fleshy at the tip, round or conical, united, placed close together, and point at the extremity with an immense number of minute nozzles for the discharge of silken threads, which are produced from matter formed in internal reservoirs. These are called Spiderers. The legs vary in length, but are composed of seven joints, of which the first two form the haunch, then the femur, the fourth and the fifth the tibia, and the sixth the tarsus. The last is ordinarily terminated by two claws, generally toothed beneath, and by a third smaller claw which is not toothed.

The most remarkable feature performed by the Spider is that of producing silken threads by means of the Spiderers above described and figured. From each one of the minute orifices of the Spiderer there exude as many little drops of a fluid, which becoming dry the moment it comes in contact with the air, forms so many delicate threads. Immediately after the filaments have passed out of the pores of the Spiderer they unite first together and then with those of the neighboring Spiderers to form a common thread; so that the thread of the spider, when it suspends itself from any object, is composed of an immense number of minute filaments, amounting even to many thousands, each of which is of such extreme tenacity that the naked eye cannot detect them till they are formed into a common thread. The Spiderers of the same spider differ in structure, and Lyonnets has shown that one set of Spiderers is employed in producing threads which are glistening, whilst another set produces threads which are smooth. This may be seen by throwing a little dust on a spider's web, such is that of a Spider, when it will be found that it adheres to the threads which are spirally disposed, but not to those that radiate from the centre to the circumference. There last are also found to be stronger than the spiral ones.

The Spiderers are in connection with an internal apparatus which secretes the matter they thus elaborate. This apparatus consists of a number of intestine-like canals which are united together, and vary both in number and extent according to the species in which they occur. These canals unite into tubes which open into the Spiderers from whence the thread is extended.

It is by means of these threads that spiders construct the various webs which they throw from one object to another for the purpose of entrapping their prey. It is said that some of the larger species construct webs in which even small birds, such as the humming-bird, are caught and

made subservient to the wants of the spider. No sooner is an insect or other small animal ensnared than the spider, placed in the centre of its net, or in a cell built at its side for the purpose of watching, darts forth, and uses all its efforts to inflict upon it wounds in which it pours the venom contained in its frontal claws. When the creature

thus caught offers too great a resistance, so that the spider becomes endangered, he retires for a time from the contest to renew his strength, leaving his victim secure in his meshes, and gradually getting exhausted from the attempts it makes to escape. When the spider returns he frequently twists the web round and round the body of his victim, and then either at once commences to make a meal of him, or waits till his appetite suggests the proper time for feeding.

Although Spiders are not provided with wings, and are consequently incapable of flight, they have a power of ballooning with their silken threads, by means of which they can make distant journeys through the atmosphere. These aerial excursions, which appear to result from an instinctive desire to seek some more favourable spot for the gratification of their appetite or other cause, are undertaken when the weather is bright and serene, especially in the autumn, both by adult and immature individuals of many species, and are effected in the following way:—They first mount to the summit of an object, and then raise themselves still higher by straightening their limbs; the abdomen is then elevated into an almost perpendicular position, and they emit from their Spiderers a small quantity of viscid fluid, which is drawn into fine lines by the ascending current of air from below, and passing through the animal's body, finding themselves acted on with sufficient force, quit their hold of the earth and mount into the air. It has been sometimes stated that spiders can forcibly propel or dart out lines from their Spiderers; but when placed on spires set upright in glass vessels, with perpendicular sides, all their efforts to escape are unavailing.

The webs named gossamer are composed of lines spun by spiders, which, on being brought into contact by the action of a gentle air, adhere together, till by continual additions they are accumulated into irregular white flakes and masses of considerable extent. The poisonous effects of the wounds of spiders are produced by means of the mandibles, or frontal claws, which are each armed with a movable and extremely sharp point, near to the point of which is a minute orifice, whence there is poured out a drop of poison into the wound. This orifice, which is very difficult to detect, communicates with a canal in the interior of the mandible; this canal proceeds from a gland situated in the interspace of the muscles of the thorax. The gland consists of a vesicle having internally a number of spiral filaments, which are connected together by a membrane in the form of a bag. Although dreadful stories are related of the effects of the bites of spiders on the human body, it appears from experiments made by Mr.
Blackwall on British Spiders, that none of these have the power of producing any ill effects on human beings. There is still wanting good evidence on which to rest a charge of poisoning man by biting him, even against the larger forms of spiders, which inhabit tropical climates.

A curious feature in the history of spiders is the power they possess of reproducing their young without having been broken off. This power, however, is not confined to spiders, as we find it in the Crustacea (Crustacea), and even in the vertebrate animals amongst the Amphibia (Amphibia). In the case of the spiders, it is never a part of a limb which is reproduced, but if a part of a leg is removed, it proceeds to throw off the remainder, and after the next molt the missing member reappears.

The species of the family Araneida are very numerous and have been arranged by naturalists under several genera. They have been investigated with great care by M. Walck-nier, who has made them the special study of his life, and has given us a natural arrangement of them according to their structure and habits of life. A synopsis of this arrangement we subjoin, as by a little study it will furnish an insight into the surprisingly varied habits of this family——

<table>
<thead>
<tr>
<th>Table of the Subdivision of the Araneida or Arachnida Filosa, into Genera</th>
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<tbody>
<tr>
<td>Name of Family</td>
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<tr>
<td>Genus</td>
</tr>
<tr>
<td>Eyes aggregated</td>
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<tr>
<td>Eyes anterior</td>
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<tr>
<td>Eyes anterior and lateral,</td>
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<tr>
<td>Eyes anterior and lateral, very unequalized.</td>
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<tr>
<td>Mandibles articulate vertically or on an obtuse plane, moving laterally.</td>
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<tr>
<td>Eyes anterior, al-most equal in size.</td>
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<tr>
<td>Araneidae</td>
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<tr>
<td>Lateral speech, hiding in holes and fissures.</td>
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<tr>
<td>Tarsocle, inclining themselves in silken tubes.</td>
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<tr>
<td>Cellulocle, sheltering themselves in small cells.</td>
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<tr>
<td>Cricocle, running swiftly to catch their prey.</td>
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<tr>
<td>Salarocle, leaping and springing with agility to seize their prey.</td>
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<tr>
<td>Latrodemocle, walking and running sideways or backwards, occasionally throwing out threads to entrap their prey.</td>
</tr>
<tr>
<td>Nictylle, going ahead, but making a web for their nests, whose lines threads are more or less sensitive.</td>
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<tr>
<td>Filbile, going ahead, but spreading long threads of silk about the places where they prowl in order to entrap their prey.</td>
</tr>
<tr>
<td>Tapillary, splashing great webs of a close texture like hammocks, and dwelling therein to catch their prey.</td>
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<tr>
<td>Gasterocle, spreading ahead webs of a regular and open texture, either orbicular or spiral, and remaining in the middle or on one side to catch their prey.</td>
</tr>
<tr>
<td>Reticular, spreading webs of an open meshwork and of an irregular frame, and remaining in the middle or on one side to catch their prey.</td>
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<tr>
<td>Aquileta, spreading filaments in the water to entrap their prey.</td>
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</tbody>
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ABRITNATION. The defects in the law, which permitted any agreement to refer disputes to arbitration, if disregarded by any of the parties thereto, to be of no avail, and which allowed arbitrations to come to an end by the death of arbitrators or umpires, or the refusal of any of the parties to proceed thereto, have been remedied by the Common Law Procedure Act, 1844. (Blackstone's 'Commentaries,' Mr. Kerr's ed., vol. iii. p. 17.)

ARCHER-FISH. [Tokok, S. J.]

ARCHIES, COURT OF. The jurisdiction of this Court in Testamentary and Matrimonial Causes has been transferred partly to the Court of Probate (20 & 21 Vict. c. 77) and partly to the Court for Divorce and Matrimonial Causes (20 & 21 Vict. c. 85); and as no act for subtraction of legacies, (20 & 21 Vict. c. 77 s. 33), or for defacement (18 & 19 Vict. c. 41), can now be entertained by any Ecclesiastical Court whatever, its jurisdiction is now confined to a few pecuniary causes, particularly concerned with the Established Church. (Blackst. 'Comm.' Mr. Kerr's ed. vol. iii. p. 93.)

ARCHITECTURE. [Public Improvements].

ARCTIC REGIONS. [Norwegian Passage, S. 2; Arctic Countries and Seas, S. 2.]

ARDEA, ARDEIDE. [Heron.]

ARENICOLA, a genus of Annelidous Animals, referred by Cuvier to the Decabranchiata, on account of their external gills. The general structure and habits of the genus determine most naturalists in placing it amongst the Terre-cidellous Annelids. (Annelida.) The gills are branched, and placed upon the rings of the middle part of the body only. The mouth is nearly, more or less dilatable, but there are no discernible teeth, tentacles, or eyes. The posterior extremity of the body has not only no gills, but is devoid of the silky bristles which are found on every other part. A. Pleurotomum, the Lob or Lug-Worm, is the most common species. It is found very abundantly in the sand of the sea-shore, where its habits afford a close resemblance to those of the earth-worm away from the shore. It is bigger than the earth-worm, sometimes being found nearly a foot in length. It is of a reddish colour, and when touched throws out a quantity of yellow fluid which stains the hand. It is employed by fishermen as bait for various kinds of sea-fish.

AREOLAR TISSUE. [Tissues, Organic, S. 1.]

ARGES. [Praesidea, Hautes.]

ARGILLUS, a genus of Entostracous Crustaceans, belonging to the section Pelecypoda. There is but one species of this genus, the A. filicresta. This little creature is not unknown to fishermen, as it is frequently found parasitic upon various kinds of fish. It was first described by Baker in his 'Employment for the Microscope,' in 1763, under the name of the 'Louse of the Carp and Barbelie and Blackbuck.' It is about the tenth of an inch in length, and is almost as broad as it is long. The head is in the form of a circular-shaped shield. The antennae are short, thick, and two-jointed. Instead of a second pair of foot-jaws it has a pair of circular or disc-shaped suckers, by means of which it attaches itself to the animals on which it parasitizes. These suckers
is admirably constructed for their use. Four muscles are attached to the base of each of these organs, and extend up to their sides. By means of these muscles, and of the force of air in the lungs, the blood is forced through the arteries by a series of pulsations, the pressure of which is examined by the heart. The heart seems to be the chief source of the circulation, and it is, therefore, evident that the blood is in a constant state of motion. It is of course impossible to describe all the vessels of the body, but I shall mention some of the principal ones. Among these are the common carotid, the brachial, the radial, the ulnar, the femoral, the popliteal, the tibial, and the pedal. These vessels are all connected by means of the microscopic vessels, which are so numerous that they can be seen by the naked eye. The body is marked on both sides by a series of ramifications of a dark colour. The female is larger than the male, and is distinguished, in addition to the ovary, by a black mark on each side of the animal. The testicles are not visible, and it is impossible to determine the sex of the animal from the external form. The Argus is found upon various fresh-water fishes. It is most frequently met with near London on the Stickleback, but it has been noticed as occurring on the Carp, the Roach, the Trout, the Pike, the Rudd, and even upon the tadpole of the common Frog. It seems to abound especially when fish are in ill health. Although mostly found upon fish it frequently leaves them, and swims freely about in the water. Fish have an instinctive knowledge of these creatures as their enemy, and it is amazing to watch in a basin of water the efforts which the stickleback will make to avoid its minute persecutor; but the efforts of the fish are in vain, for it is opposed to a creature which has the power of darting through the water with such rapidity as to cause almost an electric shock. The female deposits her eggs from 400 to 1500 in number on stones or other solid bodies. They are laid side by side in rows and glued together. They are hatched in about 25 days, and the young fish remain attached to the mother's tunic until they are able to swim. They are the smallest of the fishes and are found in many of the forms of Entomostraca. The best account, with figures and anatomy, of this parasite, is given in Dr. Baird's "History of the British Entomostraca," published by the Ray Society. Mr. Yarrell has given an account of it in the second volume of his "British Fishes." 

ARIÈGE. [CHEMISTRY, S. 2.]

ARLEIGH. [ARIES.]

ARQUEHITO, a native amalgam, consisting of six parts of silver and one of quicksilver. It has been regarded as carat by many chemists, and it has been used with great success in the mines of Arquehito in Chile. ARREST. The Commissioners of the district Comra of Bankruptcy and the Judges of the Conny Comra have now power to grant a warrant for the arrest of absconding debtors and for their detention for seven days, until a writ of capias can be procured from one of the Superior Courts of law. By this means debtors absconding from the seaports at a distance from London, may be arrested on the spot, and detained until the time fixed by the law. ARTERIES, DISEASES OF. [CHEMISTRY, S. 2.]

ARTERY, from the Greek Arteria, signifying an air-vessel, because the ancient, ignorant of the circulation, and finding its arteries always empty after death, supposed they were air containing air. Why after death the arteries are empty and the blood accumulated in the veins will be explained hereafter. By the term Artery is meant a vessel which conveys blood from the heart to the different parts of the body: a vein, on the contrary, is a vessel which conveys blood from the different parts of the body to the heart. (Classification of the Blood.) All the arteries of the system proceed from two great trunks immediately connected with the cavity of the heart, namely, the Pulmonary Artery, which issues from the right ventricle, and the Aorta, which springs from the left ventricle. (Anatomy.) The arterial system is arborose, that is, the branches which spring from the aorta successively increase in number and diminish in size as they proceed from the heart towards their extremities, so that its internal structure is so much divided into two or more branches, the combined area of which is always greater than that of the trunk from which they spring. The capacity of the branches is estimated to exceed that of the trunks in the proportion of 3 to 1, and the internal diameter of the trunks nearly ends by dividing into two or more branches, the combined area of which is almost greater than that of the trunk from which they spring. The capacity of the branches is estimated to exceed that of the trunks in the proportion of 3 to 1, and the internal diameter of the trunks nearly ends by dividing into two or more branches, the combined area of which is almost greater than that of the trunk from which they spring. 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Baring, Bart., an eminent merchant in the city of London. He was removed from school at a rather early age, and placed in the establishment of his father. Having here completed his commercial training he was sent to the United States, where, and in Canada, he for some years conducted the American business of the firm. Here he acquired much of that wide and varied commercial knowledge which he was afterwards enabled to employ to such good advantage on all matters connected with trade and commerce.

In 1798 he married the daughter of William Bingham, Esq., Senator of the United States; and on the death of his father in 1810 he became the head of the great firm of Baring, and was placed hereafter with the House of Commons, where Mr. Baring had long been regarded as a high authority on all commercial subjects. But the ministry had but a short tenure of office, Peel resigned in April, 1835, and the President of the Board of Trade of course became the chief minister. A year later, however, he had created Baron Ashburton. When Sir Robert Peel returned to office, September 1841, the differences of the United States respecting the boundary question excited some anxiety, and Peel requested Lord Ashburton to proceed to America as special commissioner, with powers to conclude a treaty. Both in England and America the nomination was received with satisfaction; and Lord Ashburton conducted the negotiations in so conciliatory a spirit, that Sir Robert Peel declared "that he had never seen in the opening of 1842 an announcement that a treaty had been concluded with the United States, in which "the adjustment of the boundary question was far more favourable to this country than the award of the King of the Netherlands," and that the other points under discussion between the two governments had been arranged in an equally satisfactory manner. In the House of Lords, Lord Ashburton continued to support the policy of Sir Robert Peel until that statesman brought forward his bill for revising the duties of the excise, in which he expected that when he gave to that measure a resolute opposition. After it became law he took little part in politics. He died May 13, 1846, and was succeeded in the title by his son the present peer.

Lord Ashburton cannot be termed a statesman in the proper acceptance of the term. But he brought to the consideration of political questions a clear calm business-like understanding and considerable experience, and though far from an eloquent speaker, his extensive knowledge and unquestioned probity, as well as his high mercantile standing, caused him in his place as a member of either branch of the legislature to be always listened to with respect. As a public man he will be remembered in connection with the treaty which is usually called by his name.

Lord Ashburton was also well known as a liberal patron of arts and artists, not neglecting while forming a valuable collection of pictures by ancient masters to employ living painters. He held the office of trustee of both the National Gallery and British Museum.

**ASIA**

Of late our knowledge of Asia has been considerably augmented. The Russians have steadily and systematically pursued the exploration of their vast dominions in the north; while the English have continued their surveys and investigations in the south and west. The eastern and central portions of Asia alone, particularly the Chinese and Japanese empires, have remained little known; hitherto inaccessible to and unaffected by the rapid tides of progress and discovery which have swept the rest of the world. The Euphrates and the Tigris, with the adjoining regions from the Mediterranean to the Persian Gulf, were thoroughly explored and surveyed by the expedition under Colonel Baring in 1827, and 1836, in the practicality of a steam-boat communication with India by that route. In 1836 an expedition was dispatched by the Imperial Academy of Sciences at St. Petersburg, for the purpose of making a trigonometrical survey from the shores of the Caspian to that of the Black Sea, in order to ascertain the difference of their comparative levels; a question which had excited great interest for twenty-five years previously. This expedition consisted of Messrs. Fuss, Sahler, and Siewidish, who within two years succeeded in making a most accurate measurement of the level of the Caspian sea. The level of the Caspian was 94 feet below that of the Black Sea.

During the years 1834 to 1837 Asia Minor was explored by Callery, De Teyxier, Brant, and W. J. Hamilton, the last of whom, given as a very valuable contribution to the physical geography of the country, and has ascertained the level of many ancient cities. From 1832 to 1837 Fedorow accomplished an important journey through Siberia, between Orenburg and Irkutsk, and between the parallels of 46° and 50° of latitude. He found the depressions and trigonometrical, which formed a new basis for the geography of those regions. During the same years Baer, Pakhomov, and Zimvolka made additions to the geography of Novazembla, and determined a portion of its eastern coast. In 1836 and 1837 Professor Kuzitzky explored the Caucasus, and published the results of his researches in various works, to which a large map was subsequently added.

In 1837 the interesting discovery was made by Moor and Dibner, that the windows in the tower of Belfort, and in the tower of London, are alike at the same level. The same year the great depression extends over the whole of Elb Ghor, comprising the valley of the Jordan as far as the Lake of Tiberias. The first accurate measurements of the Lake of Tiberias were made by the American commissioners in 1841, 1845, and 1848. By Symonds' trigonometrical survey it was found that the depression of the Dead Sea amounts to 121 feet; but his result for the depression of the Lake of Tiberias was shown to be very erroneous. This latter point has been ascertained by the American expedition to be 63 feet below the level of the Caspian. The expedition of Mr. Symonds, which is the result of the labours of the previous observations of De Berton, Russegger, and Wildenbruch.

Ambia, particularly its eastern extremity, was explored by Welles in the years 1836 and 1836; and in the latter year Lieutenant Grittingsen visited the south-western portions of the same country. In 1843 von Wrede made an important journey to Hadramaut, and in 1843 Lieutenant Richard F. Burton, of the Bombay army, in the disguise of a pilgrim, and accompanied by his assistant, Captain H. Yamba, on the Red Sea to Medina and Mecca. In 1846 an interesting journey was made in Kurdistan and Luristan by Major Rawlinson; and an expedition to Kurdistan, under Airawuß, started from Constantinople in 1836, and during two years explored the tribes of Paydar, Pishwar, and those of Armenia, and Kurdistan. The still more recent travels and discoveries of Dr. Layard have greatly increased our acquaintance with the geography of Kurdistan and Assyria. In the regions of the Himalaya Mountains and Afghanistan important additions to geography were made by Burnes, Wood, Vigne, and others. Vigne proceeded as far as Isfandob, and thoroughly explored the valley of Cashmere; while Lieutenant Wood reached the source of the river Oxus, or Amur of the moderns, formed by a lake on the plateau of Pamir, at an elevation of upwards of 16,000 feet above the level of the sea. Cashmere was also visited by Baron von Hügel. Lycia and other parts of Asia Minor were visited by Fellows in 1836 and 1840, and also by Hoxey. In 1844 a Russian expedition under Middendorf was dispatched for the purpose of reaching Cape Taimura, the northernmost point of Asia; but the country they had to traverse was found to consist of immense marshes, uninhabited, and possessing scarcely any animal or vegetable life, and after having overcome considerable hardships the expedition had to return without having reached its destination. About the same time the northern Urmi was scientifically explored by Hofmann, Keyserling, Krusenstern, and others, and rich gold alluvia of great value. The regions on the Caspian were also visited by Reisener and Lehmann. In 1847 an exploring expedition to the Tibetan frontiers was undertaken by the Indian government. This expedition consisted of Captain Cunninghame Strachey, and Dr. Thomson. Previously, in 1844, Lieutenant Strachey had succeeded in reaching the lake of Mansurovassar
A. odorata, the Woodruff, has its leaves six or eight in a whorl, with perfectly white flowers. It occurs in woods, hedge banks, and fields throughout Europe. It is abundant in some parts of England. The whole plant is remarkable for its fragrance when dried.

A. Gynanchica has it leaves four in a whorl, and flowers of a lilac colour. It is found on dry banks and hills in lime

Some species, A. arvensis and A. taurina, are native but are found wild not far from the woods.

ASPIDOPHORUS, a genus of Acanthopterygious Fishes. One species, the A. Europaeus is found on the coasts of England and Scotland. It is known by the name of the armed Bullhead, the Pooge, the Lyrie, Sea-Pooger, Ploog, and Ploog-fish. It is 12 inches long and is occasionally caught by anglers using a bait of 6 inches in length. (Yarrell, British Fishes.)

ASSIGNMENT OF CHATELAYS. [DIll or Saxe, S. 2.]

ASTERNA, a genus of Star-Fishes, including the smallest of the British species, A. gibbosus of Peannant. The Gobious Starlet has a 6-sided body, which is thick and covered below with short spines; the aves are bordered by a single row of spines, and the suckers are in two rows. De Blainville makes out of this species two, which he calls Asterina minimus and A. pravus. A. gibbosus is found very generally around the British Isles, and in the Mediterranean, and on all the shores of Europe.

ASTRONOMY. [Uranography.]

ASTROPHYTON, a genus of Star-Fishes, remarkable for the branching of its spines; of which there are three species, of which A. acutatus is British. It is however a rare animal; and although occasionally found in other places, is most commonly caught off the Shetlands; hence it is called the Shetland Angel. (Forbes, British Star-Fishes.)

ASPUSTUR.

ASUCUNION, the capital of the department of Asuncion and of the republic of Paraguay, in South America, is situated on the eastern or left bank of the river Paraguay, in the latitude 25° 16' south, long. 57° 41' west. Its situation is on the Araguai branch of the Pilcomayo. The ancient city, which stands upon a commanding spot, was built in 1535 by a colony of Spaniards under Juan de Salazar; and from the convenience of its situation speedily became a place of some consequence. It was nearly destroyed by fire in 1625, and the greater part of the houses being built of wood. From this calamity it speedily recovered; and in 1647 was a place of sufficient importance to be erected into a bishop's see. It contains a cathedral, three parishes churches, and four convents of nuns, and monasteries of both sexes; and the river Pilcomayo and the river Paraguay, which form the boundary of the province, meet here. Properly speaking the town consists of only one street surrounded by several lanes and a great number of houses which stand apart and are surrounded by groves of orange tree.

The greatest part of the houses are small and consist merely of a shop with two or three apartments attached to it. Few of the houses have flat roofs; the greater part are covered with tiles. The best buildings in the city are those mentioned above. The inhabitants are of European and Indian descent with the addition of a few negroes; their number is estimated at 10,000. Asuncion carries on a considerable trade in the export of hides, tobacco, sugar, and mate or Paraguay Tea, which is largely used all through South America. Great numbers of horned cattle, horses, mules, asses, sheep, and goats are bred by the farmers, who grow wheat, maize, sugar, tobacco, cotton, mandioc, potatoes, and other vegetables. Honey and wax are produced in abundance; and the rivers supply large quantities of fish.

The air in and about Asuncion is generally temperate and genial; for the greater part of the year the wind blows from the south.

The policy of the late Dictator of Paraguay, Dr. Francisco Pascual Francea, in prohibiting all intercourse with foreigners and with the surrounding states, preserved the republic from the miseries of constant civil and political commotions so characteristic of the neighbouring American republics; but was very detrimental to the trade of Asuncion and of the republic generally. By treaties concluded with great powers in the year 1833, the subjects of Great Britain, France, Sardinia, and the United States are free to navigate the rivers of Paraguay, and to settle and trade in any of the towns of the republic. In the dry season vessels drawing 6 feet water and in the wet season vessels drawing 12 feet can sail up to the city...
Auckland, above which the river Paraguay is navigable for vessels of moderate size for 60 miles.

ATHAMANTINE. [Chemistry, S. 2.]

ATROPINE. [Chemistry, S. 2.]

ATTACHMENT OF DEBTS. A creditor who has recovered judgment against his debtor, may now, on obtaining a judgment, apply for the arrest and sale of the estate of the judgment debtor by third parties; then either by a summary application to a judge at chambers, or where the debt is disputed by the garnishee (the person in whose hands the attachment has been laid), by proceedings similar to those in an ordinary action, for the settlement of the dispute himself, in discharge of his own claim; such payment operating as a discharge to the debtor. (Common Law Procedure Act, 1854.)

AUCKLAND. [Geology, N. W.]

AUGUSTE EDEN, 2nd LORD and 1st EARL OF, eldest surviving son of the 1st lord, was born in 1784. After receiving his education at Eton and Oxford, he entered the House of Commons as M. P. for Woodstock, but was soon removed to the House of Lords by his father's death. He formed a part of the Whig administration as President of the Board of Trade, and was appointed First Lord of the Admiralty by Lord Melbourne in 1834. In the following year he went out to India as governor-general. His administration is marked by the ill-advised Afghan war (1839), and the Bombay Act, which was passed in 1843. In 1849, having been previously advanced to an earldom; the final settlement of the Afghan affair was left for his successor, the Earl of Elibonbridge. Lord Auckland died suddenly of a heart attack on May 6th, 1849.

AUCKLAND ISLANDS, named after Lord Auckland, lie in 51° S. lat., 168° E. long., about 800 miles S.S. from Van Diemen's Land, and 180 miles S. from New Zealand. The group, which was discovered in 1806 by Captain Briscoe, consists of one large island and several smaller ones. Auckland, the largest of the group, is about 30 miles long and 15 miles broad, and contains about 100,000 acres. The entire group is of volcanic formation, composed of greenstone and basalt, and presenting a picturesque appearance. Auckland, the highest hill, situated on Auckland Island itself, is estimated at about 1350 feet above the level of the sea. There is a marked difference between the west and east coast of Auckland Island, the west coast presenting towards the sea a line of precipitous cliffs, whereas the east coast exhibits here and there a fine sandy beach, upon which the sea scarcely breaks, and is intersected by numerous streams and inlets; while the elevated land from the sea-bay to the summit is clothed with luxuriant vegetation and covered with a thick layer of vegetable mould, which is three feet deep at some places. The eastern coast contains two principal harbours, formed by inlets of the sea, which reach to within two or three miles of the western coast, and are only six miles from each other. At 30° S. lat., at the western extremity of the island, is protected from the long southerly gales by a range of small hills, and has a good tenacious clay bottom. Port Ross contains an upper inlet called Laurie Harbour, about four miles wide, and perfectly landlocked; while the steep beach on the southern side of the harbour affords great facility for clearing and reloading vessels.

The climate has been described by Sir James Ross, Captain Briscoe, and other navigators who have visited the islands, as mild, temperate, and salubrious. The temperature in the valleys is scarcely ever over 58°, or lower in summer than 78°. The weather is generally good, but there are occasional high winds and heavy rains. Auckland Island is abundantly supplied with small streams. The soil is well watered; the hills, except a few of the highest and the elevated terraced fields, are covered with moss and a kind of tall grass. Dr. Hooker notices the Auckland Islands as remarkable for the variety of their vegetable productions, eighty flowering plants having been found; and over 5000 varieties of mosses, till then unknown, have been noticed for their beauty and novelty. The only animals found on the island are goats and rabbits. Pigs were left on Auckland Island in 1805 by Captain Briscoe, on his second visit, and these animals have greatly increased in numbers, and are now an extremely valuable article of food. Fowls, ducks, and small birds were found. On the heights petrels breed in considerable numbers. Hawks, gray ducks, snipes, cormorants, and the common shag also inhabit the islands. Fish are plentiful. The coast of Auckland Island, and the rocks are covered with limpets, while the whale fishing carried on in the neighbourhood may yet become very valuable. Sir James Ross mentions that while he was in Laurie Harbour many sperm-whales came into the anchorage.

The Auckland Islands were granted by government to the Messrs. Enderby on advantageous terms, in consideration of the services rendered by their father to this country, as also for the more recent discoveries of the southern continent by Captain Enderby and his crew. A company was formed, and incorporated as 'The Auckland Islands Company,' to which the Messrs. Enderby ceded their privileges, obtained a charter of incorporation on the 16th of January, 1849, for the purpose of prosecuting the whale fishery in the southern seas, and was chosen as the head station of the company, from the superior facilities it affords to whaling vessels. The islands were uninhabited until the Southern Whale Fishery Company, under the conduct of one of the Messrs. Enderby, made a settlement here in 1848.

AUDOUIN, JEAN VICTOR, was born at Paris on the 7th of April, 1797. His early education was intended to fit him for the law, but his inclinations were towards the study of organic nature, and he accordingly gave up the study of medicine. His mind was early directed to the study of the natural history of insects. The first paper which he published was a description of an animal belonging to the class Insecta, in 1816, and from this date to the time of his death, his labours in this branch of study were incessant. The results of his investigations were published in the form of contributions to the various journals or in the Transactions of societies. These papers were numerous, and they are all valuable.

He is best known for the anatomy of the Insecta, and especially those on the Annelida, introduced him to the notice of Cuvier, Geoffroy St. Hilaire, and Latreille, with whom he lived on terms of intimacy, and from whose instruction he obtained those enlarged views of the relations of the animal kingdom which are so conspicuous in his admirable works. In 1828 he became connected with M. Milne-Edwards in researches upon the Crustacea and Annelida, which resulted in a great addition to existing knowledge on the subject of the minute worms and various other invertebrate animals. In the same year he became assistant to Lamarck and Latreille in the Jardin des Plantes, Paris, and on the death of the latter he was appointed professor of entomology in the museum attached to that institution. In his lectures here he paid particular attention to those insects which were injurious to vegetation. His investigation of the economy of insects was very extensive, and only a small portion of the matter he had collected was published before his death. He left behind him fourteen quarto volumes of manuscript on this subject, with numerous illustrations, and a considerable number of charts of the distribution of insects in France, prepared and published a work, entitled 'Histoire des Insectes nuisibles a la Vigne, et particulierement de la Pyrale qui d&egrave;vaste les Vignoles des D&eacute;partements de la Haute-Garonne, des Alpes Maritimes, des Pyr&eacute;nees-Occidentales, de la Haute-Garonne, de la Charente-Inf&eacute;rieure, de la Maine, et de Seine-et-Oise.' It came out in six parts quarto. The first part appeared in 1840, but the last did not appear till some time after the author's death, in 1845. The work treats not only of the natural history of these insects, but also of the means of preventing their increase and of destroying them. It is illustrated with beautiful plates, after drawings by the author, and, whether regarded as an example of careful observation, and the application of its illustrations, is probably one of the most valuable ever contributed to entomology.

Audouin fell an early victim to the pursuit of his favourite science. He was called to the bar by order of the Emperor of France, for the purpose of investigating the habits of the insects which injure the olive-plantations. Here he exposed himself to the cold and wet, which brought on an attack of apoplexy, of which he died on the 9th of November, 1841. On the day of his funeral the sales were delivered at the Faubourg St. Antoine, under the direction of M. Serres, president of the Academy of Sciences; M. Chevreul, director of the Museum of Natural History; M. Milne-Edwards, and M. Blanchard. Audouin had collected a fine museum, not only of individual insects, but of the different species that he had discovered. They were exhibited after his death at the museum of the Jardin des Plantes. His library was large, and when sold by public auction at his decease realised 30,000 francs.
for the study of the habits and the structure of insects. In all his more important works on entomology, it is evident that he did not regard insects as the end of his inquiries, but that he looked upon them as a great class of phenomena, illustrating the general laws that were deducible from the study of the whole animal kingdom. With him external forms were only regarded as dependent on an internal structure, which in its development, and the functions it performed, corresponded to the whole animal kingdom. It was thus that he was led to investigate the annulose subkingdom of animals, and succeeded in adding to science so many important facts which assist in indicating the true relation of these animals to one or the other division of the animal kingdom.

(Abridged from the Biographical Dictionary of the Society for the Diffusion of Useful Knowledge.)

AUDUBON, JOHN JAMES, an eminent American ornithologist, was born in the county of Lancaster, on the 4th of May, 1780. Both his parents were French. His father, who was an ardent admirer of the beauties of external nature, endeavoured from his earliest years to foster in him a similar taste, and especially directed his attention to the many tribes of birds which inhabited that part of the state in which they resided. The boy's passion for the study of birds and everything connected with them, soon outran his father's promptings. While still a child he obtained possession of several of the splendid-plumaged specimens of American birds; and before he was about fourteen, his father took him to Paris, and placed him in the studio of the celebrated David. Here, though he neglected the study of the higher principles of art, he became a skilful draughtsman; and satisfied with having obtained the competency of a profession, resolved to become a draughtsman of the first order. A few years afterwards he was recommended by a celebrated ornithological illustrations, the boy determined to become a draughtsman himself.

Feeling his deficiency in the elements of drawing, he applied himself with great assiduity to acquire the ability in that branch of art, and lengthened it when he was about fourteen, his father took him to Paris, and placed him in the studio of the celebrated David. Here, though he neglected the study of the higher principles of art, he became a skilful draughtsman; and satisfied with having obtained the competency of a profession, resolved to become a draughtsman of the first order. A few years afterwards he was recommended by a celebrated ornithological illustrations, the boy determined to become a draughtsman himself.

In 1798 his father gave him a farm in Pennsylvania, near the village of Schuylkill, but he badly neglected his agricultural duties. Of his occupations here, he says, "my rambles invariably commenced at break of day, and to return wet with dew and bearing a feathered prize, was, and ever will be, the highest enjoyment for which I have been fitted."

At the age of twenty-three he went to Philadelphia, and there he made the acquaintance of Mr. Martin Davis, a wealthy young merchant, who shared his after fortunes. For nearly twenty years he now pursued commerce (nominally) and his success was what may be expected. He removed westward to Louisville, and there first met Wilson, with whom he was afterwards closely connected. In 1810 he sailed forth on a great exploring expedition, and sailed down the Ohio with his wife and child, bird-sketching as he went. In the next year he explored Florida. Finding the joint pursuit of business and science impossible for him, he soon abandoned his nominal business altogether.

On the 5th of April, 1823, he visited Philadelphia, where Dr. Mease, his only intimate friend in the place, introduced him to Charles Lucien Bonaparte, prince de Muratbugno, and then to the lapidary, Dr. Chaloner, in whose cabinet he published a splendid continuation of "Wilson's Ornithology." The prince warmly encouraged him in his plans, and he now began seriously to contemplate publication. From Philadelphia he went to New York; and thence, along the coast line of the Atlantic, to New England, through all our northern forests. It was now he projected, in a methodical manner, his famous publication of illustrations, which he divided into numbers, to each number five plates, according to the general plan of Dr. Wilson, indicating all the dimensions of the science; and very often they are presented also in the most capricious attitudes, but with the strictest fidelity to nature.

After a ramble of eighteen months, he returned to his home, to Mount Arden, in the surrounding forests, and there passed the winter. Without the means of publishing his great work, the third part of which, when it appeared, cost 40l. per copy to the purchaser, he landed at Liverpool in 1826. His letters of introduction procured him a cordial, and even enthusiastic, reception in that town, in Manchester, and in Edinburgh, where he commenced the publication of his illustrations and descriptions of the "Birds of America." The work, however, was quickly transferred to the hands of London artists. In September 1826, he once more visited France, where he was most hospitably welcomed by the scientific world. Baron Cuvier presented a panegyric of him before the Institute. Charles X., Louis Philippe, and other great personages, the Duke of Kent, the Duke of Cambridge, Humboldt, the Institute, and others, joined his subscription list. By the 25th of November 1826, the eleventh number of the work, and 100 plates, had appeared.

He now determined to revisit America for the purpose of refreshing supply of materials, and to compete with back with him to Europe. On the 1st of April he set sail, and in about a year he returned with Mrs. Audubon. Having again gone back with his wife to America in August 1831, he proceeded to Florida, explored the forest of Muna, made a voyage to the Gulf of the St. Lawrence and the coast of Labrador, and visited Newfoundland and Nova Scotia. On the 28th of April 1833 he held at New York, where now the greatest honour was paid to him, an exhibition of his illustrations of American water-birds. In 1834 he again went to Florida, and thence to Texas. The scientific fruits of Audubon's romantic rambles had procured him many tokens of respect. He became a Fellow of the Linnean and Zoological Societies of London; of the Lyceum Natural History Society of Philadelphia; of the Geological Society at Paris; of the Wernerian Society of Edinburgh; honorary member of the Society of Natural History at Manchester, of the Royal Scottish Academy of Painting, Sculpture, Architecture, and Agriculture; of the Society of Arts; and of the American Philosophical Society. Audubon's book was the largest and grandest which had been published on Ornithology. Every sort of bird is engraved, male, female, and young. The drawings are admirable; and the descriptions are second in merit to Audubon's life of exploration and study was prolonged to the ripe age of 71. He died on the 27th of January 1838, at Minnis-
after a journey of excessive difficulty and privation, established the startling fact that there is not a single water-course on the whole coast of Australia from Moreton Bay to King George's Sound, a distance of more than 1,500 miles.

Whilst these attempts were being made to penetrate towards the interior from the south, Captain Wickham, in Her Majesty's Sloop *Erebus*, was endeavoring to reach the northern coast.

In command of the Beagle, he carried on a survey of the intertropical shores of the continent, which led to the discovery of two considerable rivers—the Victoria, in 14° 29' S. lat., and the *Beagle* in 13° 54' E. long. Captain Stokes succeeded Captain Wickham in the command of the Beagle, and penetrated nearer to the centre than had been done before.

Captain Sturt, in his last journey, left Adelaide on the 16th August, 1844, and followed the course of the Murray as far as its confluence with the Darling, then struck northwards. Crossing vast tracts of barren ground and the great stony desert, on the 9th of September, 1845, he reached 24° 50' S. lat., 126° E. long. He arrived at Adelaide on his return, Jan. 19, 1846.

Sir Thomas Mitchell spent the year 1846 in an exploring journey into the interior of tropical Australia, making his way immediately to the westward of the mountain range which separates the east and west coasts, and to the coast of Moreton Bay. He had to pass over a great deal of dry and barren land, but he also discovered a large extent of singularly beautiful and rich country, especially about the head of a river which he discovered near 28° S. lat., and which he named the Hunter. He was determined to cross the country, however, was unable to continue his way to the head of the Gulf of Carpentaria, the main object of the journey; but as he was strongly of opinion that the Victoria would be found to fall into the Gulf of Carpentaria, Mr. Kennedy, after the return of the expedition, was despatched to continue the search along its banks. He found that the Victoria, called by the natives the Barcoo, soon turned to the south-west towards the interior. He followed it for about 100 miles beyond its regular course, and was left by the river, which dwindled away and was lost in the sand in 26° 15' 9" S. lat., when, owing to the failure of water, he was compelled to return. Making his way homeward by a route much to the west of that by which he as well as Mitchell had before proceeded, he discovered a wide extent of rich and well-watered pastoral country.

Dr. Leichhardt started on his overland expedition from Moreton Bay to the north coast, at the end of September, 1843, and proceeded to the end of the year 1845. In this journey Dr. Leichhardt reached a large extent of beautiful and fertile country. At the end of 1846 he started on a still more difficult and perilous journey, from the eastern coast to the western, across or on the skirts of the great stony desert, which was traversed by Sturt in 1844, 1845, and 1846. In this last and fatal journey he found a country of remarkable beauty and fertility—a discovery which he, with characteristic ardour, returned 300 miles to the nearest frontier station to report. The richness of this part of Australia is therefore well established; and although the frequent failure of the streams is at present a complete bar to any successful squattting settlements, little appears to be wanting for the development of its resources besides the construction of dams, by which the channels of many of the streams might be at once converted into canals for the reservation of the water, and of reservoirs, for which the undulations of the land afford peculiar facilities. Dr. Leichhardt, in this last journey, was accompanied by Mr. Loyd, whose name has been given to one of the rivers on the east coast. Dr. Leichhardt has not since been heard of, and there seems to be hardly a doubt that he and all his party have perished in the great central desert.

The latest expeditions on the interior of Australia was that of Mr. A.C. Gregory, from the north-west coast which was explored at Moreton Bay, and proceeded by sea to the mouth of the Victoria River. The horses were landed at Point Pierce, in Sept. 1855; and on the 5th of May, 1856, the party was carried in boats to a bend in the river, and thence by land to the country to the south of the Victoria River, having penetrated the interior deserts to 18° 29' S. lat., 127° 30' E. long. On the 21st of June Mr. Gregory left the encampment on the bank of the river, accompanied by six persons. The arid nature of the country compelled them to increase the latitudes to 15° S., after which they kept parallel to the coast as far inland as water could be found in the rivers, the greatest distance from the sea not exceeding 100 miles. Proceeding northwards along the south coast, they reached the *Beagle* in Sept. 3, and made some ineffectual attempts to proceed to the south-east. Want of water compelled them to pursue a route parallel to the coast, to 17° 20' S. lat., when the Gilbert River enabled them to follow a south-eastern course, reaching 21° 40' S. lat., Oct. 19, when they reached the Burdekin, Oct. 16. Their route was then along the right bank of that river to the junction of the Suttor River, which was followed up to the Beylano. Tracing the Beylano to its junction with the *Beagle* River, they reached the junction of the Comet and Mackenzie Rivers, whence their course to the Dawson brought them, on the 22nd of November, to the farthest station of the settlers, whence they proceeded to Brisbane.

Of the *Beagle* River, Dr. Leichhardt, 1846.—The Australien Alps, which occupy the south-eastern angle of the Australian continent, rise to an elevation of 7000 feet above the sea, and their summits are perpetually covered with snow. In the rest of the mountains-range which flanks the eastern coast, the loftiest summits seldom exceed the elevation of 4000 feet, though there are some which rise to 6000 feet.

North of 33° S. lat. the principal valleys are transverse, and the course of the rivers is consequently west and east. The result is that the plains are generally level, and free from the great degree of declivity, however, considerably towards the south. Its entire length from its source in the Liverpool range is above 200 miles. It is navigable for small vessels up to Morpeth, about 35 miles from its mouth. Its two principal tributaries, the Loddon and the Lachlan, are both navigable, the former being 200 miles from its mouth, the latter only 140 miles. The upper Loddon, or Loddon Creek, is navigable for about 30 miles from its mouth, and is divided into two branches, the main course being navigable for about 18 miles, and then running into a series of lakes, which are in reality the mouths of two branches of the river, the one of which is about 18 miles long, and the other 13 miles. Its estuary stretches about 30 miles across the country, being in places 13 miles in width.

On the north of the Murray is a large long, narrow, almost navigable lake, which affords a fair passage between the north and south, and is navigable to a depth of 10 feet in places from its mouth, where the ship navigation is stopped by a rocky shoal, but boats ascend 40 miles higher. The Moreton Bay district and the country northward appear to be free from the drouths which are so destructive in the southern parts of the country.
North of Moreton Bay the mountains recede to the west, and about 20° S. lat. become much lower, losing in fact, in a progressive manner, all their former altitude. The coast is comparatively easy access to the extensive pastoral regions which Sir Thomas Mitchell and Dr. Leichhardt have described in the interior. On this part of the coast, near 22° S. lat., is Fort Bowen, near Broad Sound, the outlet of the Nanga and York inlets. Port Bowen is well adapted for steam navigation, and appears likely some day to become an important harbour. The country northward is almost unknown. The entire north-eastern coast, from 22° S. lat., is bordered by small islands and rocks forming what are known as the Narran Islands, which descends from the western slopes; it has a large body of water, but on account of sand-hanks is un navigable. The Wimmers and other streams which flow northward from the Grampians are lost in shallow lagoons, which are formed in the sand; the mouth of the largest of these is the Yarra Yarra, which rises in the mountains east of Melbourne, flows past that city, below which it is navigable. The country north of these mountains, which forms the northwestern part of Port Phillip Bay, has an extinct crater on its summit. Between this and the Murray are low ranges of hills generally running parallel to the shore, and separated from each other by level plains, which are subject to inundations, but afford excellent pastures. The western shore of Spencer's Gulf is Port Lincoln, the best harbour in South Australia, and around it is much fertile country. Off the entrance of Spencer Gulf lies Kangaroo island. West of this, to Streaky Bay, is a mountainous tract, known as Gawler's Range, the summits of which increase in height towards the west, where they attain an elevation of 2000 feet. West of Streaky Bay, and extending into Western Australia, is a waste and dreary country, covered merely with heath.

Of the whole of the western end of the continent is included in Western Australia. The coast from Port Lincoln to King George's Sound forms the Great Australian Bight, and presents a very remarkable appearance; from Streaky Bay to Cape Arid, about 600 miles, there is a succession of cliffs from 300 to 600 feet high. The interior here, as far as it has been explored, consists of apparently interminable plains; no river is visible and no fresh water procurable. Immediately west of the Great Australian Bight, lies the Arid Peninsula, which, between the month of Albany, the town of which is the town of Albany, the country improves considerably. The surface is much broken, and there are lofty hills and rapid streams. From the south-west of the Arid Peninsula, the Avon and Darling Range of Mountains, which terminates there in Point D'Entrecasteaux and Cape Leeuwin, runs northward as far as Shark Bay, at a distance of from 50 to 100 miles from the coast, and rising from 600 to 3000 feet above the sea. Portions of these connected mountains are known as the Gairdner's, Moreby's, Herschel, and Victoria ranges. The highest summit, Tul-banop, is said to attain an elevation of 5600 feet. The extensive plains are covered with a rich deposit of red sandstone or limestone. They are mostly barren, but at some distance inland near the Blackwood River, which falls into the sea at the western angle of Flinders Bay, Mr. Roe found considerable forests of timber-trees fit for naval purposes; he also discovered good coal in two or three places. East of the mouth of the interior are sandy deserts. Swan River has a bar at its mouth, but within it is navigable for some distance. The bed of the river rises rapidly from its mouth, and some distance inland the channel is frequently dry. Perth, the chief town of Western Australia, is built at the mouth of Swan River.

Along the north-western coast the country differs considerably from any part of the continent hitherto described. Instead of a lofty range of hills rising at a short distance from the shore, the coast from North-West Cape along the Dampier Archipelago, to Roebuck Bay, and thence along Buccaneer Archipelago up to the rocky promontory, near Prince Regent's River, is a low sandy level, covered with salt-leaved plants. Near Prince Regent's River the coast is broken into bold granitic head-lands, some of which are 800 to 1000 feet high. Numerous islands, some of them hasaltic, line the coast, and the scenery is wild and striking. Mounts Trafalgar and Waterloo rise to the height of 900 feet, and as described from the sea, they appear to consist of the coast as far as Cambridge Gulf, are low hills. At Cambridge Gulf a river of some importance falls into the sea. It was named the Victoria by its discoverer, Captain Stokes, R.N., who ascended it in 1838, and named it the Ransome, which he called the Fitzroy Range. In its lower reaches the Victoria flows through low, sandy, mangrove flats, which at its mouth have been cut into numerous islands, covered during floods; but higher up, its banks are hilly and very fertile. The Somerset, a tributary river of the Macdonald range, which consists of hills averaging from 400 to 600 feet in height. Nearer the shore, between Cambridge Gulf and the Gulf of Carpentaria, these hills become lower, and terminate generally in sandstone cliffs, seldom exceeding 60 feet in height, and sometimes forming a high ledge of 840 feet. From the Mosquito Flats a connected range, from 700 to 800 feet high, runs off to the north-east. Stretching away from the river towards the interior Captain Stokes saw apparently interminable plains.

Near Port Eucla, the main rivers of the interior, the Paroo, Murchison rivers is the Macdonald range, which consists of hills averaging from 400 to 600 feet in height. Nearer the shore, between Cambridge Gulf and the Gulf of Carpentaria, these hills become lower, and terminate generally in sandstone cliffs, seldom exceeding 60 feet in height, and sometimes forming a high ledge of 840 feet. From the Mosquito Flats a connected range, from 700 to 800 feet high, runs off to the north-east. Stretching away from the river towards the interior Captain Stokes saw apparently interminable plains.

The shores of the great Gulf of Carpentaria are almost invariably low and flat, and generally covered with mangroves. The banks, which are of clay or sand, are seldom more than 50 feet above sea level; but along the eastern sides there are more small trees, but the shore is one wide, low, level, sandy waste. The rivers which fall into the gulf are few and unimportant. One or two inlets which appear to be the mouths of rivers, have indeed not hitherto been explored, but there is nothing to lead to the belief that they differ from those which have been followed up. The chief of the rivers in the Gulf of Carpentaria are the Flinders and the Albert, but like the others they consist merely of short and narrow streams opening into wide shallow estuaries. The Albert was ascended by its discoverer, Captain Stokes, in a boat for about 50 miles from its mouth. He found it bordered by open woodlands of acacias and gum-trees. When unable to ascend the river further, he made his way on foot south-west towards the interior of the country, and found it to consist of vast and apparently boundless grassy plains, relieved by occasional clumps of gum-trees; he named them the plains of Promise. Another river, which he named the Albert, was also found by Captain Stokes, and was bordered by alluvial flats and extensive extensive small creeks. The coast of northern Western Australia, that the adventurous Kennedy was murdered by the natives.
of drift and sometimes 100 feet high, running in parallel lines as far as the sight could reach. The dryness and the heat of the climate is intolerable. In the midst of this plain, near 25° 33' S. lat., about 30° E. long., is a considerable and quite sterile desert, which extended, as far as he could ascertain, about 80 miles in length and 35 miles in width. Near 27° 33' S. lat. Captain Sturt discovered a sheet of water which he called Murrumbidgee Creek, extending eastward and westward for nearly 80 miles, and on each side in arid sand.

It has been supposed that this creek may be in seasons of flood connected with the singular horse-shoe shaped depression known as Lake Torrens, which as already mentioned in part encircles the mountain at the head of Spencer's Gulf and that on the other side it might unite with Sturt's Stony Desert. Lake Torrens, it may be as well to mention, though called a lake, is not filled with water, but is merely an extensive depression, the bed of which is for the most part dry, with occasional uncocunced pools and muddy holes. In seasons of great floods it would no doubt be filled with water, which it is possible may find an outlet in Spencer's Gulf. In a country where rain was abundant Lake Torrens would of course be a permanent lake, according to the ordinary occupation of that term.

Generally it may be said of the continent, that the ranges of mountains mentioned as stretching along the south-eastern and eastern coasts, in some places come close down to the shore and leave but a narrow strip of sandy or dry or wet plains, with occasional sandy tracts, to extend between them and the sea. Towards the interior, beyond and nearly parallel with the mountain ranges, are undulating downs of moderate height extending between them. Mr. Darling Downs, discovered by Mr. T. Mitchell, the Goulburn, Balmain, and the New England district, with vast fertile plains, lying along and between the great rivers. These downs afford the chief sheep run, and to the cattle pastures. Farther inland are wide-spread marshes and worthless jungle, and enormous baron, arid, and sandy, or stony deserted wholly uninhabitable, and which have hitherto baffled all attempts to explore them. No dense forests have been discovered in those sections of the country in the Murray Bay district and in tropical Australia. The trees are almost invariably light of foliage and very marked in character. The herbage is thin; the grasses are nutritious, but generally grow in detached clumps.

The river system of Australia, as far as known, is peculiar. Many of the rivers of the interior are lost in the sands, others are subject to immense overflows so as to convert in the wet season a large portion of the adjacent country into vast swampy land, and by season their places quite dry and they are converted into a number of scarcely connected lakes. Few of the rivers which fall into the sea are navigable, and nearly all have bars or other encumbrances at their mouths.

The Murray river system at its junction to the other known streams of the Australian continent. The basins of this fine river are in the deepest recesses of the Australian Alps. The headwaters of its immediate tributaries extend from the 36th to the 32nd parallel of latitude, and from 146° to 149° of longitude. It reaches the low lands near 36° S. lat., 147° E. long., not far from the rising town of Albury. Its course from this place is exceedingly tortuous, the curvatures being short, abrupt, and very numerous. The whole of the upper course is obstructed by sand shoals, and snags formed by trunks of trees, and other objects which have caught in the bed of the stream; but there appears to be no insuperable obstacle to the clearance of the channel if there were sufficient intercourse to render it profitable. It would however be a costly and useless enterprise, and unless otherwise an embankment were formed, as the river is subject to anual overflows, when the country for a considerable space on both sides is converted into a swamp. These floods prevent agricultural operations being carried on. The banks of the Murray, above the junction of the Murrumbidgee and the Murrumbadbée rivers. No river here falls into the Murray on the right bank, but there are numerous creeks which pass from the Murray to the Edward River, which is a great arm of the Murray which runs between the main stream and the Murrumbidgee for many miles, and receives near its eastern end the Billabong River. A large portion of the level country between the Murray and the Darling is a swamp; much of the remainder is covered by the Edward, and the many connected channels, and the innumerable lagoons, or 'billabongs' as they are called by settlers. Many of these lagoons have on the top a thick coat of salt; indeed the whole Murray district is so covered in this mineral. The soil is generally a grey clay. The Murray receives the Murrumbidgee in about 143° E. long. The river is here about 350 feet broad, from 12 to 20 feet deep, and flows at the rate of 25 miles an hour. In 141° 30' it receives the Murrumbadbée River, which is here 100 yards wide and rather more than 15 feet deep. As far as the junction of the Darling the Murray continues to flow to the west-north-west, but afterwards it passes between some limestone cliffs and its course changes to the west, and the river is considerably increased in size. After passing the meridian 140° it trends to the south; and in this direction it flows without receiving any tributary of consequence till it expands at its mouth into the Lake Victoria, which is 60 miles long and 40 miles broad, but generally very shallow. The water of the lake is brackish and it communicates with the sea at Encounter Bay by a passage impracticable even for boats. The river Murray however is navigable for vessels of considerable burden, being navigable for steamers of 500 tons; and can be followed from 20 to 25 feet deep. It appears certain indeed that it is navigable for steamers of light draught up to its junction with the Darling; and recent explorations have shown that it is possible to ascend the river till the point of its junction with the course of its windings, the length of the Murray is probably not less than from 1300 to 1500 miles. Little influenced by the sudden floods to which the other Australian rivers are subject, its rise and fall are equally gradual. Instead of forming a great sheet of water as do the countries on the margin of the Mediterranean, it is a marsh or exhausitng itself over extensive plains, its Never-failing fountains have given it strength to cleave a channel through the interior desert, and carry its broad and trans- parent waters to the sea. The Murrumbidgee is the first addition to its waters from the eastward in the month of July, and rises at the rate of an inch a day till December, in which month it attains a height of about seventeen feet above its lowest or winter level. As it swells it fills in succession all its lateral creeks and lagoons, and ultimately leaves many small lakes and rivers.

As it rises, so it falls, gradually. No river falls into the Murray after its confluence with the Darling, nor doess any fall into the Darling from the west after it reaches the low lands of Australia, as all the streams are in the north or north-east.

**Geology, Mineralogy, &c.**—We possess so few facts, comparatively, respecting the geological structure of Australia beyond an enumeration of a somewhat limited number of localities in which granite, limestone, sandstone, and other rocks are generally described, as by their isolated occurrence, that it would be of little use to attempt to give a general description, or even to institute comparisons with the known European deposits. Here we shall do little more than enumerate the principal varieties of rocks merely stating as a general law that, as far as known, the geological formations are almost entirely of the kinds commonly termed primary and tertiary. Secondary rocks are scarcely anywhere met with. It is however premature to draw general conclusions. The mineralogy of Australia is excelling, but presents an extraordinary amount of attention, and the geology also is being with more or less care and skill investigated, so that additions are almost daily being made to our previous store of information. The results will be more conveniently given in a more extended work. The direction of the mountains and the strike of the rocks of which they are composed are almost invariably north and south; the only important exception being on the north side of the continent, where there is an inclination to the east and west. Secondary rocks are described as occupying the south-eastern and eastern portions of the island, having frequent masses of metamorphic rocks in connection with it. Much of the granite is the granite proper, and its granular structure, its schist and phylspar and hornblende so largely abounded as to modify the granitic type; in some places the hornblende predominates, and frequently, as between Armuprior and Braidwood, the granite passes into siltite and porphyry. Examples of all these varieties are met with in the Australian Alps, about
The sources of the Murray, in Moonee, in the Currambene Range, the Araluen and the Main ranges, Mount Victoria, and many other parts of the eastern side, are well watered, and vary as usual very much in their mineralogical structure. Very commonly they consist of basalt, greenstone, and various argilloides, and have an overlying deposit of conglomerate grit and sandstone. The trappean regions of Manero, which may be taken as illustrative of the trappean regions of the south-eastern portion of Australia, is of this character. According to the Rev. W. B. Clarke, the government commissioner, "the physical features of this region are precisely similar to those of the Grampians and Lakes district in Victoria. The division between granite mountains (here the Snowy and the Coast mountains), which it has filled up, sending its streams of consequently lava to considerable distances on each side of the general line of the axis of eruption. In Manero this axis has a north-west and south-east direction, and ranges from the head of the Towamba towards the principal bed of the Murrambidgee, at the northern extremity of the Snowy Mountains, or Australian Alps. Connected with this general trend of the trappean, the discovery of space, their texture, structure, and composition, prove them to have a common relation with each other, and with the great development which has occasioned the remarkable connection between the Snowy ranges to the west and the Coast district. The running discloses in the interior, the general division between the waters flowing on the northern side to the Murrambidgee, and on the southern to the Snowy River. It is to the trappean outburst, which is undoubtedly a result of the same agency, that the broken and discursive condition of the pressure of the vast mass of snow to the Hindmarsh, Wallace, and Wellingbury is in a considerable measure due; it has directed the principal drainage of the country in two opposite courses, and has produced innumerable physical discordances in the features of the country.

A large portion of the basin of the Murrambidgee is occupied by quartz phorphyry, which is also largely developed in many other places. Porphyritic and basaltic dykes are very frequent. Very fine examples of columnar basalt occur at Coroo and elsewhere on the great dividing range, and not unfrequently in other parts of the great mountain district. Serpentine, soapstone, pitchstone, and a fine red Jasper are frequently met with in the trappean districts. Laminated, compact, and fossiliferous limestones are found in numerous places. Coal and the running Tree is limestones and marbles, a little below Glenrock, the limestone is seen passing into staurolite marble, white and crystalline; black marble occurs in strata in Bourgu Creek. A bed of limestone, which appears to agree with consideration in thickness both north and south of Bathurst, has been termed "bandonation." The coal and associated bed of sandstone and shell, which occur extensively on the eastern coast from Port Stephens to Botany Bay, occasionally ranging into the interior, have been considered equivalent to the coal-measures of Europe, merely from their mineralogical characters. What the age of this Australian coal deposit may be we have no means of accurately judging; but it is worthy of remark, that a fossil plant (Glossopteris Browni) detected in it is also discovered in the trappean district, and its presence itself appears to be abundant and generally of good quality. Coal also occurs in great quantities on the Warrumbungle Mountains and elsewhere in the mountain district of New South Wales. Mr. R. in 1846 discovered coal by the north of the Fitzgerald River, about 140° 40' E. long., 20° S. lat., and by the Charles River some distance to the west, both places being in or near to Daintree Island and easy of access. It has also been met with in several other localities.

Sandstone rocks extend very generally through the mountain district. Sydney is built upon a sandstone deposit, which extends as far inland as Mount Victoria, and forms the bulk of the Blue Mountains. Its southern limit is Fort Stephens. The sandstone in its various stages, from the very fine-grained, argillaceous, and calcareous, in parts they appear very similar to those of the old red-sandstone formation of England. Found in conjunction with fossileous lime- stones and conglomerates they closely resemble those of the Devonian system. Both the limestones and sandstones are of exceeding value for economical purposes. Sandstones and limestones are the prevalent rocks of the shores of Western Australia. In North Australia is a great sandstone plateau rising 1800 feet above the level of the sea.

The slate and other schistose rocks are numerous and important. A quartziferous schist is the predominant rock of the country between the Canobolas and the Carlingford Valley, and it prevails extensively throughout New South Wales and the eastern part of Victoria. The soil which covers this rock is generally poor, but the rock itself is rich in minerals. The slates are commonly grey, bluish, and greenish in color, and have a glistening appearance. The slates are not infrequently intersected by veins of quartz and trap. Grey or brownish-white, soft or hard, felafal beds of schist occur in conjunction with the slates, passing "into a true girt or sandstone, and becoming occasionally very quartzose, bands of quartz and thin fibrous veins of quartz traversing them." Clay-slates and other argillaceous deposits are also general. The clays and other tertiary deposits occupy a wide area; in fact, it is probable that the whole interior is formed of horizontal tertiary deposits, broken here and there by tracts rising from them, like islands from the bed of an inland sea. Good brick and pottery clay is found.

Australia was not until lately considered rich in minerals. The first gold was discovered in New South Wales in 1846, and still more the extraordinary discoveries of gold in 1851, however led to investigations which have gone far to show that Australia is mineralogically one of the richest countries in the world. The first official mention of gold in the country was made in the official despatch of Sir George Gipps, lieutenant-governor of New South Wales, dated 2nd of September, 1840, in which is included a report from Count Strzelecki, stating that he had discovered a stream of Gwyd, in 1839, a small quantity of gold in an "innerfing-sulphide" which was "undoubtedly deposited." No further notice was taken of this communication. Sir J. E. Murchison, however, in the course of various statements respecting the Urals, which he read to the Geological Society of London, in 1843 and 1844, called the attention of men of science to the fact of the similarity of the formation of the Australian to those of the Urals Mountains, and asserted his belief that gold must exist in Australia. No steps were taken to pursue the inquiry practically, and it was not until 1846 that Sir Roderick addressed a letter to the Geological Society of Cornwall, urging unemploying Cornish miners to emigrate and search for gold in the drift and debris of the Australian Alps. In 1846 Sir Roderick addressed a letter to Earl Grey, the then Secretary of State for the Colonies, who forwarded it to the Governor of New South Wales, and it was subsequently pointed out, as the Sierra Nevada in California. But it was not until 1849 that a Mr. Smith communicated to the governor, Sir C. A. Fitzroy, that he had found gold in a particular place, produced a specimen, and offered to discover the locality by the certain and somewhat later Mr. Lancotlford forwarded a specimen weighing 34 ounces, which he had found in the river Turon, near its junction with the Macquarie, with a similar proposal. The offer was accepted; and on the 1st of April, 1851, when Mr. Hargraves, who had returned from gold-seeking in California, wrote to Governor Fitzroy, announcing that he had been seeking for and had found gold, and offering to discover the localities on being assured of a reward. The offer was accepted, and a bill would meet with a reward, but declined assuring him of any beforehand. Upon this Mr. Hargraves disclosed the places where he had found gold—namely, Lewis Port, Summerhill Creek, the Macquarie River, and another in the districts of
Bathurst and Wellington, about 150 miles west of Sydney. When the government officer was sent in May to examine the claims and the diggings, he found them unproductive. The governor immediately issued a proclamation claiming the gold for the Crown, and forbidding any person to dig for it on his private account. But this was found at once to be quite impracticable, and these restrictions were soon swept away by the governor to grant licences at the rate of 30s. per month. By May 26th there were 1000 persons employed in digging and washing at Summerhill Creek and its neighbourhood, which took the name of Ophir. In July gold was found in two places, first at the colony of Victoria; and from that time the discoveries of fresh localities still richer in gold have been made almost without intermission. On the 3rd of June the governor ordered a reward of £500 to be paid to Mr. Hargraves, who subsequently received a ten-year lease as assistant colonist. During the early part of 1852, a further sum was awarded to him, making his reward in all amount to 5000l. Policemen were appointed to the various stations, and escorts furnished for bringing the gold from the diggings to the ports of Sydney or Melbourne. An assay-office was subsequently established at Adelaide, and a mint has been established at Sydney. The effect of the gold discovery on the colonists was most extraordinary. In a short time the towns and villages were deserted, all the small agricultural traffic was suspended, and every one capable of labour repaired to the diggings, so that serious apprehensions were entertained that the growing crops would be left unattended, the wool of the numerous flocks remain untended, and the flocks themselves be destroyed by disease. But no such evil was vouchsafed; the colonists averted the colonists exerted themselves to obtain assistance, and on the news that gold was to be had for gathering being made known in England, an immigration ensued almost without a parallel. It is estimated that in 1852 not less than from 90,000 to 100,000 persons left England for Sydney and Melbourne, and it was found difficult to provide ships to convey them. The emigration from England during 1853 was on an equally large scale, but has since somewhat diminished. A railroad has been constructed between Adelaide and Port Adelaide, and several of provisions rose greatly, particularly in the diggings, which are usually in remote districts, to which there are no roads; the sheep instead of, as previously, being shorn and their carcasses boiled down for tallow, were driven to the diggings for food, and the wool and skin taken away. The effect on the public revenue is shown in a striking manner by a comparison of that of the colony of Victoria in the first three quarters of 1851 and 1852. In the three quarters ending September, 1851, the revenue was 256,992l. 19s. 3d.; while in the three quarters ending September, 1852, it was 979,476l. 3s. 1d., being an increase of 783,494l. 14s. The revenue of Victoria in 1857 was upwards of 3,000,000l. From the first discovery of gold in Victoria up to 9th February, 1853, the quantity of gold produced by Victoria was estimated by government authorities to have amounted to 6,166,234 ounces, of the estimated value of 19,373,377l. The gold exported from Victoria during the year 1857 amounted to 5,582,798 ounces, valued at 25,393,964l., or about 45 per cent less in value than the total amount of gold paid to the Government. The places where gold has been found now extend from the Grafton range, New South Wales, in 26° S. lat., 149° E. long., to Ballarat in Victoria, 37° S. lat., 144° E. long.; while two small gold fields have been discovered about 37 miles from Adelaide, South Australia, 33° S. lat., 130° 20' E. long. What may be called the main gold region of New South Wales alone, including no portion of the northern district, where gold has been found in considerable quantities, and in which wholly omitting the valuable gold-fields of Victoria, the number of persons employed is estimated by government commissioner, the Rev. W. B. Clarke, after several surveying journeys, to embrace an area of 16,000 square miles; and this he says, in a subsequent report, "is strictly within the limits of South, and very nearly of the whole of the county," which is the district west of the Murray River, and is almost entirely desert excepting several important mountain ranges at no considerable distance." The whole basin of the Murrumbidgee, from near Bellanangam to the junction of the Queanbeyan River, is also said by Mr. Clarke to exhibit "not only metallic formations of the purest and richest kinds, but iron," in conjunction with abundance of limestones: quartz porphyry is here the prevalent rock. And in other districts the metals have been found under equally promising circumstances.

Lead has been found in New South Wales, and worked successfully at Yattagoolinga mines, where the average yield is said to be 75 per cent. of lead and 18 to 20 oz. of silver to the ton of ore; it is also worked at some other mines. In the great mountain ranges of Victoria and New South Wales, lead has also been found in the Darling Range and near Mount Gipps and Mount Stirling. Iron ore abounds on the eastern coast of New South Wales, where also coal is found in large quantities; whence we may conclude that at no very distant period the eastern side of Australia may be studded with iron foundries, distributing their products over Southern Asia and among the numerous islands of the Indian and Pacific oceans. From the discoveries of the mountain ranges and many Warrnangallungu mountains. Argillites and lead ores occur extensively in the regions of the Australian Alps. In South Australia iron-ore is said to abound in the mountains on the East of Spencer and St. Vincent gulfs; at Rapid Bay, Eyre Peninsula, and on the coasts of the Great Australian Rock Hill. No iron works have however, we believe, been yet established.

Native silver has been found in small quantities. Tin has also been found in New South Wales. Blacklead is said to have been found near Adelaide, at Mount Torrens, and in the Belvedere Range, South Australia. Manganese and sulphur are also reported to have been found. Indications of quicksilver have been met with in the vicinity of the Ophir gold-diggings. In the recent explorations of the mountain ranges it has been found that the precious genes exist in many parts of New South Wales, Victoria, and South Australia. The surveyor-general Sir T. L. Mitchell brought with him, on his recent visit to England, a diamond which has been pronounced a diamond by the Royal Society of London. Mr. Stichbury, the government geological surveyor of New South Wales, reports having seen a small but beautifully crystal- lised diamond from the Turon River, and topazes, garnets, rubies, sapphire, and chrysolite, found near Bathurst. The q

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in the clay slate formation; the lead runs from east to west. Many other copper and some lead mines have since been opened in the colony, with more or less success. The gold excitement has for a while almost entirely suspended the exploration of mountain regions. The number of careful examinations which have been made of the gold regions, especially those undertaken by the government geological surveyors, have made known the existence of numerous and widely-spread metallic veins, of considerable value, which are now being worked. The gold which has been passed away, lead to most important mining operations. The value of some of these regions may be estimated from the Report of Mr. Clarke to the government respecting a portion of country situated on Oulong near the junction of the Queanbeyan and the Conder with the Delegate River, about 37° S. lat., 149° E. long., near the boundary of New South Wales and Victoria. The district is occupied by sites, traversed by quartz and trap, with occasional patches of granite; but, he says, "what renders this locality so interesting and full of promise is the fact, that in addition to the four metals, gold, iron, lead, and copper, existing in so narrow a compass, there is also abundance of excellent limestones to serve as flux in case of its requirement, and abundance of water in the vicinity, which is absolutely necessary for the preparation of the ores." The lead is reported to vary in quality and quantity in great ranges at no considerable distance. The whole basin of the Murrumbidgee, from near Bellanangam to the junction of the Queanbeyan River, is also said by Mr. Clarke to exhibit "not only metallic formations of the purest and richest kinds, but iron," in conjunction with abundance of limestones: quartz porphyry is here the prevalent rock. And in other districts the metals have been found under equally promising circumstances.

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Large tracts of limestone occur on the eastern and south-eastern side of the continent; clay flats for the economic purposes of life are common in many places; there are numerous sandstone districts which seem well adapted for ornamental buildings; gypsum is found abundantly in the clay and sandstone districts, and the vicinity of Swan River; and there is roofstone stable in the eastern and western parts of Australia.

Climate.—The climate of Australia differs considerably from that of other countries. The most remarkable as well as the most interesting of its characteristics is the dryness which occasionally prevails. Captain Sturt says:—"The year 1826 commenced the severe droughts to which we have reason to believe the climate of New South Wales is subject. There has been inferior quality during the past year, and with unabated severity. The surface of the earth became so parched that the minor vegetation ceased upon it. Culinary herbs were raised with difficulty, and crops failed even in the most favourable situations. Settlers drove their flocks and herds to distant tracts for pasture and water."

The interior suffered equally with the coast, and men at length began to despair under so alarming a visitation. It almost appeared as if the Australian sky was never again to be traversed by a cloud. These seasons without rain appear to continue for a period of one or two years. They are succeeded by excessively long rains, but afterwards the rains decrease gradually year after year until they again wholly cease for a time.

Another peculiarity is the quick transition from heat to cold. There are instances of the thermometer having varied 25 degrees in 50 minutes. This is owing to the sudden change of the winds. The north-west winds blowing over the great sandy deserts in the interior attain such a degree of heat before they reach the plains and mountains that the thermometer rises suddenly from 80° to 110° in the shade. On the other hand, the south-east winds are often cold and piercing, especially when there is a sudden shift of wind. The thermometer in South Australia often falls 40 degrees in a quarter of an hour.

But in spite of such occurrences, which are to be considered as exceptions, the climate over most of the settled part of the country, though somewhat too dry, is commonly delightful, and the evenings and mornings as pleasant as in southern Italy. Even the great heat which occurs does not produce relaxing and enfeebling effects on the constitution. On the contrary, many stock-keepers, who have been of the country from September to March between 36° and 106°, its mean elevation being 70°; and in winter (from March to September) between 27° and 95°, its mean being 60°.

In the interior and to the west of the mountain ranges the wet season commences from Bathurst to Hunter's River, or has been generally observed in the beginning of the winter. Dews are very frequent and heavy, and sometimes they fall as a drizzling rain. Hall-sprains are common in December and January.

On the low coasts frost is very little felt, but in the hilly districts it is frequent, and very keen on the high terraces on the western side of the mountains, especially on the plains of Bathurst and the plains contiguous to them; these districts are 2000 feet above the sea. It is likewise observed that in these parts of the country the seasons are nearly a month later than on the low district on the coast. The snow lies on the tops of the mountains and occasionally also in the valleys for many days together, but it is absolutely unknown in the plains of Bathurst and the plains of the coast. In his explorations of Tropical Australia, Major Mitchell experienced much frost, the thermometer being on the 24th of June 17° Fahr., or 15 degrees below freezing point. Probably comfort was experienced by any of the party, circumstance which he attributes to the great dryness of the atmosphere.

The climate on the eastern coast is very favourable to health; and endemic diseases are not known with the exception of a few cases of small-pox; they are well known in their employment, and in their occupation; in this latter case the natives have been receiving 204 a year, and the commissioners seem to be agreed in stating, that "both the disposition of the aboriginal native to work, and of the settler to make use of his labour, has been considerably increased by the employment of paying them by a money wage has tended greatly to produce this change in the habits of the native; and as the setters are now fully alive to the fact, there can be no doubt that the practice will be continued." (Report of Mr. Commissioner Merewether.)

The above statement is affirmed very strongly by the cases where the system of money payments has not been adopted, the settlers still find great difficulty in retaining the natives as servants, and complain of their idleness and misconduct. In Victoria the report is much the same, and in South Wales; but in South Australia there seems to be much satisfaction felt at the change in the aborigines. The Protector of the Aborigines in that colony states that upwards
of 900,000 sheep were in June, 1853, under the sole charge of
native shepherds. A training institution for aborigines has been established at Adelaide, chiefly by the exertions of
Archdeacon Hale, who resides on the establishment. He
says that even his "own sanguine expectations did not lead
him to anticipate a speedier result from Native Australia
than that which has attended our efforts, nor so rapid an increase
in the number of our inmates." Besides the school-room,
mess-room, &c., there are 20 huts occupied by native married
couples. There is also a small farm, the work of which,
with herding, is still going on. It is done by the inmates of
the institution, who are also taught brick-making, building,
and other useful occupations. In New South Wales a
"native police corps has been established," which the
Governor-General reports to have been done much in maintaining
order amongst the aborigines. There appears, he adds,
to be no difficulty in recruiting for this force, as
the young men of the different tribes are found anxious to enlist.
Quarterly reports respecting the condition of the aborigines
are made by the district commissioners to the governors
of the several colonies, by whom they are regularly transmitted
to the Secretary of State for the Colonies.

**Divisions, Government, 
&c.—The entire island of Australia**
is a British possession. It is divided by the British govern-
ment into the colonies of New South Wales, Victoria, South
Australia, Western Australia, and the district of North
Australia. New South Wales occupies the south-eastern
portion of the island, extending from the shores of the Pacific
to 141° E. long., and northward to 26° S. lat. Victoria is
separated from the north by this portion of the Pacific, and
from New South Wales by the Murray River, and a line carried from its source
on the Australian Alps in a south-eastern direction to Cape
Howe. Its southern boundary is the Southern Sea; on the
west it is divided from South Australia by the meridian of 141°
E. long. South Australia extends from 141° to 132° E. long.,
and northward to 26° S. lat. Western Australia occupies the
entire country west of 139° E. long. North Australia oc-
cupies the entire country north of 26° S. lat. and east of
139° E. long. The population is chiefly collected about the
south-east coast in the colonies of New South Wales and
Victoria; Western Australia is very thinly peopled. North
Australia is not colonised, the settlement of Port Essington
having been abandoned; on this coast there are consequently
no European inhabitants, but a considerable number of Malay
fishermen have settled upon it. The total population (ex-
clusive of natives and Malays) in 1850 was 335,107, of whom
265,503 belonged to New South Wales and Victoria, 63,700
to South Australia, and 5,904 to Western Australia. It has
since very rapidly increased, owing to the immigration con-
sequent on the gold discoveries.

On August 9th, 1850, an Act of the Imperial Parliament
received the royal assent, by which representative constitu-
tions were given, as distinct colonies, to New South Wales,
Victoria, South Australia, and Western Australia (as well as
to Van Diemen's Land); with power to form other districts
if necessary, and also powers of modification. The details
of the constitutions will be found under the heads of the
several colonies. The governors of Victoria, South Australia,
BAILLIE, JOANNA, was born at the manse at Bothwell, near Glasgow, in 1762. She was the sister of Dr. Matthew Baille. The history of her uneventful life is soon told. The daughter of a man of the parish of Divinity, and of a mother in whose family superior intelligence seemed a common property, Joanna, while trained in the strictest manner usual in a Scottish manse, not only received an excellent education, but from her childhood was brought into constant intercourse with people likely to call into action her own mental gifts. Her career through life was quiet, unobtrusive, domestic; her tastes were all studious; her disposition was gentle, kindly, and unobtrusive. At an early period she removed to London, where her brother, Dr. Baille, was settled as a physician. After a time, she, with her sister Agnes, took up her residence at Hampstead, which, while from its proximity to the metropolis it allowed her to enjoy ready intercourse with the many friends her literary fame drew about her, insured her at the same time a certain amount of retirement; and here the rest of her lengthened life was spent. She was known and esteemed by the most eminent of her contemporaries of more than two generations, and for very many years, even from the New World, visitors, attracted by her friendly nature and her capacity for making acquaintance and to listen to her conversation. Those who visited her out of admiration returned adding to that sentiment feelings of affection and respect. She died at Hampstead on the 22nd of February, 1811, in her 89th year, having retained her faculties to the last.

Though Joanna Baille possessed in a large measure that keen and sensitive instinct in all that developed the feelings or touched the destinies of others, and that sensibility and sympathy which predispose for the golden path of moral excellence, yet these sentiments had in her instance more of perverseness and of speculative character than of fire, and made her seek and find events in her own thoughts rather than in action and experiment. Adventure may be, and has often been, the school of poetry for men; but a woman, and especially one of Joanna Baille's feminine and modest disposition, must invoke the muse with a serener and more gentle worship. A close and penetrating observer, and gifted with no common genius, but not favoured with the highest, nor weakened with the inspiration of 'many-mindedness,' which makes poetry of the first order bear to philosophy the same relation that intuition bears to calculation, Joanna Baille early in life conceived a literary project based on the discovery of her talents. With the permission of her greatest works, the celebrated 'Plays on the Passions.' The principle on which all these plays were constructed was to select some one of the more powerful passions that agitate mankind, and to exhibit it in full action, by making the hero of the drama completely subjected to it, and by evolving out of the promptings to which he is represented as paying undivided and uninterrupted allegiance, every incident and situation. Admitting fully the noble poetry with which these plays are filled, and even the deep interest of many positions and events, it is evident that such characters must have a constrained, morbid, and unreal aspect; since in life, as in the dramatic creations of the highest genius, we constantly see that the dominant passion is turned aside or suspended by, it may be transient, but for the time irresistible, counter-thoughts or the force of circumstances; and this is a main reason why her plays have only achieved a partial and temporary success on the stage. Yet the one moral position often allowed by commentators in her most secret workings—subjected to a keen and searching analysis.

It was in 1798 that Miss Baillie published the first volume of her 'Plays on the Passions.' She was then thirty-six years old, and a second edition was called for in a few months. In 1802 she published a second volume. Two years later, appeared her 'Miscellaneous Plays.' Among these were the 'Family Legend,' a tragedy, which she used to term her 'Highland play.' It was acted for the first time at Edin-
but not sudden improvements he gradually increased its circulation, and extended its influence, while his good taste and temper led him to abjure all grossness and bitterness of altercation.

In 1857 he again opposed Lord John Russell's scheme for state education of the poor, and the opposition of the dissenters was so strong that the plan was withdrawn. On August 8, 1858, he was taken ill, and after a short illness, he died, and was honoured by a public funeral.

BALBI, ADRIEN, was born at Venice, April 22, 1782. At an early period of his life he was appointed professor of Arabic and Persian at the University of Padua. At large at the influence he acquired arose from his being among the first who introduced 'leaders' or original editorial dissertations on political subjects into a provincial paper; these leaders being distinguished by the moderation of their tone, their independence of the authority of others, and the force of their style, and their general good sense. In the severely contested election for Yorkshire in 1807, he took an energetic part in support of Lord Milton in opposition to Mr. Lascelles, although he differed in opinion from Lord Milton-townsmen chose him for alderman as a mark of their respect, but he immediately resigned the office. In 1847 he again opposed Lord John Russell's scheme for state education of the poor, and the opposition of the dissenters was so strong that the plan was withdrawn. On August 8, 1858, he was taken ill, and after a short illness, he died, and was honoured by a public funeral.

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tural produce. There is a very productive salmon fishery.
A fever hospital and a dispensary are in the town. Ballylome has a number ofQUALITY andpetty sessions are held; there are fairs on May 13th and August 19th.
The surrounding scenery is remarkably fine, having a fertile and extensive plain towards the sea, bounded on the south and east by the range of the Ox Mountains, and on the west by Nepkin Mountain (2640 feet), and the highlands of Erris. Ten miles north-east of Ballyna, near the shore of Killala Bay, is the ruined castle of Leasan, now called Castle Forbes, remarkable as having been the patrimony of the Forbes family. It contains hereditary scribes and historians of the ancient Irish territory of Hy-Fiachra.

(Travels and Customs of Hy-Fiachra. Published by the Irish Archeological Society, Dublin, 1844; Thom's Irish Almanac.)

BALLINROBE, county of Mayo, Ireland, a market and post-town, and the seat of a Poor-Law Union, in the parish of Ballinrobe, and barony of Kilmaine, is situated on the Bove River, 2 miles from its estuary in Lough Mask, in 53° 37' N. lat., 9° 6' W. long.; distant 141 miles N.W. by W. from Dublin, and 4 miles S.W. from Hollymount on the leading road from Tuam to Castlebar. The population in 1841 was 2078; in 1861 it was 1912, exclusive of 350 inmates of the Union workhouse. In 1851, the county contained 16 electoral divisions, with an area of 144,886 acres, and a population in 1841 of 83,113, in 1851 of 72,856.

Ballinrobe is picturesquely situated chiefly on the left bank of the river Bove, and has on the whole a clean and neat appearance. It is separated from its former importance. In the town are the parish church, a large chapel for Roman Catholics, a chapel for Protestant Dissenters, a market-house, a dispensary, a bridewell, and in the town is a barracks station and a station of the county constabulary force. A market for agricultural produce is held weekly, and fairs on Whit Monday and December 9th.

BALLYOTA, a genus of plants belonging to the natural order Orchidaceae, of which there are several species, among which the most common and most useful is B. fœtida and its variety B. ruditîs. B. fœtida is the most common plant, and goes by the name of Horse- storn. The White Horse-horn is the Marrubium vulgare.

BALLYMENA, county of Antrim, Ireland, a market and post-town, and the seat of a Poor-Law Union, in the parish of Kirkkinsiela and barony of Lower Toome (with the suburb of Harryville in the parish of Ballyclug and barony of Lower Antrim), is situated on the right bank of the Braid River, 2 miles from its estuary into the Lagan. It is the most ancient town in the county, and its inhabitant numberless. In 1841 it was 5949; in 1861 it was 6316, besides 857 in the Union workhouse. Ballymena Poor-law Union contains 23 electoral divisions, with an area of 160,653 acres, and a population in 1841 of 74,159, in 1851 of 71,123.

Ballymena stands in the midst of a very densely-populated district, extending from the neighbouring town of Broughshane on the east to the river Bann on the west. The population here unites the manufacture of linen with the pursuits of agriculture, Ballymena which is their chief market possesses a very considerable and flourishing trade both in linen and agricultural produce. The town is built of stone, and has a respectable appearance. There are any two Roman Catholic, a Wesleyan Methodist, and three Presbyterian places of worship; a market-house with a spire, the Union workhouse; a dispensary, and a bridewell. Quarter and petty sessions are held, and the town is the head quarters of the county constabulary. Saturday is the market day. Fairs are held on July 26th and October 21st. In the vicinity are extensive bleach-grounds. The surrounding district, although divided into very small holdings, is cultivated to the utmost, and presents a rich and pleasing landscape.

BALLYMONEY, county of Antrim, Ireland, a market and post-town, and the seat of a Poor-Law Union, in the parish of Ballymoney and barony of Upper Dunlusk, is situated on the leading road from Belfast to Londonderry, 3 miles E. of the river Bann, in 50° 4' N. lat., 5° 31' W. long., 18 miles N.W. by N. from Ballymena, 84 miles S.E. from Coleraine, and 146 miles N.W. from Dublin. The population in 1841 was 2393; in 1851 it was 2681, exclusive of 373 in the Union workhouse. It contains 33 electoral divisions, with an area of 187,115 acres, and a population in 1841 of 60,710, in 1851 of 62,418. The town is irregularly built on a small stream which runs into the Bann, near the church of the Establishment, a chapel for Roman Catholics, several churches, a town-hall, a dispensary, the Union workhouse, and a bride walk. Quarter and petty sessions are held, and there are here stations of the constabulary and the revenue police. Ballymoney has a small trade in linens and dairy produce is held monthly, and fairs are held on May 6th, July 10th and October 10th.

BALM. [Callimorphis, S. 1; Melithena, S. 1]

BALSAM, [Callimorphis, S. 1; Melithena, S. 1]

BALZAC, HONORE DE, a French novelist, was born at Tours, May 20, 1799. He was the son of a clerk under the government of Louis XV. At the college of Vendôme, where young Balzac was sent early, he gained the character of an idle and indolent student, and was removed to a private academy. On leaving school he was placed with a notary in Paris, but he almost immediately commenced writing articles for the journals. These are said to be rather testimonies of his perseverance than monuments of his genius. About this time he had published 'Contes du dimanche,' none of them exciting or deserving much attention, under the assumed name of Horace de St-Anbin. In 1825, in connection with one Barbey, he commenced business as a printer and bookseller, and among other things published an edition of Fontenelle's 'Monuments,' written by himself, and commenced the 'Annales Romantiques.' His speculation was altogether unsuccessful. In 1829 he appeared before the public for the first time, under his own name, with 'Le Père Goriot.'

It was not however till the publication of his 'Peau de Chagrin,' in 1839, under his own name, that the Parisian world became acquainted with the genius that distinguished his works. From that period he was a general favourite in France, and many of his productions have been translated into most of the languages of Europe. He was indefatigable in supplying the public craving under the title of 'Comédie Humaine.' He planned a series of compositions that was to embrance every phase of human society; and at this he worked for twenty years. Among the most popular were 'Le Fils de l'Amour,' and 'Le Père Goriot.'

On the publication of the 'Médecin de Campagne,' in 1836, Balzac received a complimentary letter from the Countess Eveline de Hanse, the wife of a Polish nobleman, possessing large estates in Russian Poland. Balzac replied, and an acquaintance was thus formed. In 1838 he selected and translated into French his novel of 'Sersaphia' was dedicated. The countess became a widow, and a few months after the revolution of February 1848 Balzac quitted Paris to bring her back as his wife. He inhabited a large house in the hotel Montmorency, and conducted a number of people under his influence, and in which he hoped to find happiness and peace. But even before his journey he had been attacked by a disorder which it was found impossible to cure or to postpone—illness of the heart—of which he died, August 20, 1850. He was buried in the cemetery of Père-la-Chaise, an immense crowd attending the funeral; and Victor Hugo pronounced a critical oration over his grave. In that eulogy, he says, Balzac 'chastised vice, disected passion, fathom'd and surround'm man's heart, his feelings, his sphere in the abyss of each in its very essence.' There is more asserted here than an English reader can concur in. Balzac had a rich fancy, but not a pure taste; he was an acute observer, but often overambitious, sometimes extravagant, and sometimes wearisome. His 'Contes Drolastiques'—thirty short tales—are written in an antiquated form, a sort of resemblance to the 'Hepameron Francois' of Margaret of Navarre. The 'Contes Phintiques et Romantiques' are the tales of M. de Balzac and the others of Voltaire, of which they are in some degree imitations. His dramas, of which he wrote a few, were failures.

(Nouvelle Biographie Générale.)

BANAGHER, King's County, Ireland, a post-town in the parish of Ballygarry and barony of Garrycastle, is situated in 53° 19' N. lat., 7° 54' W. long., on the left bank of the river H
Shannon, which is here crossed by a bridge leading to Galway by way of Eyrecourt; distant 24 miles S.S.W. from Shannon harbour, where the river is connected by the Grand Canal with Ballinasloe on the west, and Dublin on the east, and 83 miles W.S.W. from Dublin by the high road. The population in 1841 was 2227. In 1846, the town was built on the intersection of the Brr and Eyrecourt road with that leading from Shannon harbour to Limerick. The old bridge of 18 arches was removed in 1843, and a new bridge of 6 arches of 60 feet span each, with a width of 45 feet, was erected in its stead by the Irish Board of Works. At the eastern end of the bridge is a barric and a magazine, and there are batteries which command the bridge and its approaches on both sides of the river, and which are chiefly in the hands of the Military. Prior to the Union, Banagher was a corporate town, and returned two members to the Irish Parliament. Petty sessions are held here. Fairs are held on May 1st, September 16th, October 28th, and November 8th. The adjoining district is flat, and in the immediate vicinity of great tracts of bog, but it is well cultivated.

BANBRIDGE, county of Down, Ireland, a post-town and the seat of a Poor-Law Union, is situated on the left bank of the river Bann, on the leading road from Newry to Belfast, in 54° 20' N. lat., 6° 16' W. long, 13 miles N. by E. from Newry, and 76 miles N. from Dublin. The population in 1841 was 3524, in 1851 it was 5501, exclusive of 478 inmates of the Union. The Banbridge Union comprises 23 electoral divisions, with an area of 194,992 acres, and a population in 1841 of 87,100, in 1851 of 74,844.

The principal part of the town is built upon an eminence, having a steep declivity towards the river. To obviate this inconvenience, a causeway of the width sufficient to admit of the alteration, was lowered to a depth of fifteen feet, leaving elevated causeways on each side. In carrying this arrangement into effect, it was necessary to remove the old market house which was formerly stood in the middle of the street on the summit of the hill: a viaduct connecting the opposite terraces now occupies the site. The town consists chiefly of this main street, and is substantially and neatly built, but has no building of pretension except the new market and centre of the main street. The church is pleasantly situated on a level green adjoining the bridge, on the right bank of the river. The Wesleyan Methodists have one chapel, and the Presbyterians have three chapels. Petty sessions are held here, and there is a station of the constabulary force. Twelve fairs are held in the course of the year.

The linen trade in all its branches is carried on with great activity in the immediate neighborhood. The line of the Bann, from a distance of several miles above the town to the mouth, is covered with an almost continuous succession of bleach-greens. At Huntley Glen, a little below the town, is a large thread-spinning factory; and at Seapatrick an extensive establishment for weaving union cloth by machinery. A bridge has stood at this point of the Bann from a very early date. John Barham, A.D. 1210, the place is mentioned under its present name.

(Fraser, Handbook for Ireland; Original Communications.)

BAND-FISH. [Carpola.]

BANKRUPTCY. The numerous statutes relating to bankruptcy have been consolidated by the Bankrupt Law Consolidation Act, 1849, which has been amended in one or two particulars by the statute 17 & 18 Vict. c. 119. The classes of persons who are declared bankrupts are the persons whose creditors are unpaid, and extended, and the proceedings in court simplified. They are commenced by a petition either by the trader himself, or by a creditor or creditors; upon which an adjudication is made, and after notice, a petition is presented to the Lords Justices of the Court of Appeal in Chancery, who are in place of the judges of the Court of Chancery, and upon the judgment of the court is brought in the name of the bankrupt in the mean time vested by the adjudication in an official assignee; and on a choice being made by the creditors, in him and their assignees jointly, the control of the Court being exercised throughout on the collection and distribution of the estate. Contributions, in the shape of Bankruptcy (7 & 8 Vict. c. 111), insurance companies, and banking companies of more than seven partners (7 & 8 Vict. c. 113), may be made bankrupt. Joint Stock Companies, with limited liability, are wound up, when necessary, in the Courts of Bankruptcy; and the Court of Chancery may send the winding-up of companies, whose liability is unlimited, to this tribunal (19 & 20 Vict. c. 47; 20 & 21 Vict. c. 14). Blackst., Comm., Mr. Kerr's ed., v. ii. p. 494. See also Insolvency.

The bankrupt laws of Scotland have been consolidated to some extent, and the procedure in a sequestration simplified and cheapened by the statute 19 & 20 Vict. c. 79.

The Statute 18 & 19 Vict. c. 59, which aggrandized the laws relating to bankrupts and insolvents in that part of the kingdom have been consolidated, and the administration thereof committed to a new court called 'The Court of Bankruptcy and Insolvency' (20 & 21 Vict. c. 60).

BARKER, BARBARA.

BARBERRY BLEIGHT. [Jacobite.]

BARBUS, [Barbel.]

BARHAM, REV. RICHARD HARRIS, was born December 6, 1786, at Canterbury, where his family had resided for many generations. He was an only son, and his father, who died in 1793, left him a small estate. In 1808 his right arm was severely shotted by the upsetting of the Dover mail, in which he was travelling to St. Paul's School, London. His life was despaired of for some time, but he ultimately recovered, and regained the use of his arm. From St. Paul's School he was removed to Brasenose College, Oxford, where, during a short but severe illness, he first entertained the thought of entering into the church, though he had previously been inclined to enter the army. He afterwards became a student in the church, and was ordained for the cure of one of the places in the city of Gloucester, and was afterwards admitted to a small pension at Truro, as a candidate for a vacant minor's way. He was, in 1821, ordained a deacon, and in 1824, a priest; and was presented to the living of St. Michael's, Glastonbury, by the Archbishop of Canterbury to the rectory of Snargate, and he obtained at the same time the cure of Warham, the former in Romney Marsh, Kent, a district much frequented by smugglers, and the income of it was very much in reality a duty of State. As the church was absolutely unknown to him, he had no chance of success, he was only elected in 1821. He thenceforth devoted much of the time not required by his professional duties to contributions in verse and verse to the periodical publications of the day. His 'My Cousin Nicholas' in 'Blackwood's Magazine,' and about one-third of the articles in Gorton's 'Biographical Dictionary' were written by him. 'My Cousin Nicholas' has since been published in a separate form.

In 1824 Mr. Barham received the appointment of a priest in the ordinary of the Chapel Royal, and shortly afterwards was presented to the rectory of the united parishes of St. Mary Magdalene and St. Gregory by St. Paul's, London.

The 'Miscellany of the University of Oxford' published in 1824 by the Rev. Theodor Hook, the Rev. Sydney Smith, and several other of the distinguished wits of his day, and was, like them, a frequent dinner-entertainer, a sayer of good things, and a teller of droll stories; but his writings are not now dwelt on, and were much respected by those who knew him.

The 'Ingoldsby Legends' have been published in 3 vols., post 8vo. 'A Memoir of the Rev. Richard Harris Barham,' by his son the Rev. R. H. D. Barham, precedes the Third Edition.

BARKER, THOMAS, was born near Pontypool, Monmouthshire, in 1769. His father was by profession a barrister, but being a man of desultory and expensive habits,
George Staunton, to whose son he had given lessons in mathematics, the appointment nominally of comptroller of the household to the Emperor of China; but really to take charge of the various philosophical instruments carried out as presents to the emperor of China. Of this journey he published an account some ten years later in a thick quarto volume entitled "Travels in China." In this embassy Mr. Barrow secured a present of Lord Macartney, that his lordship made him his private secretary on being appointed Governor of the Cape of Good Hope in 1797; and when Lord Macartney quitted the Cape in 1798 he left Mr. Barrow in the post of auditor-general of public accounts. During his stay at the Cape Mr. Barrow devoted his leisure hours to the study of the geography and natural history of South Africa, and made several journeys into the interior. On his return to England he published theictures of his travels in the "History of the British Empire in Various Parts of the World," the "History of the Cape of Good Hope," and the "Travels in Southern Africa." In 1804 Mr. Barrow was appointed by Lord Melville to the responsible post of second Secretary to the Admiralty, the duties of which he continued to discharge for a period of forty years under thirteen administration.

In this office Mr. Barrow was earnest and indefatigable in the promotion of every project which commended itself to his judgment as calculated to advance the progress of geographical or scientific knowledge. Especially did he aid in the extension of the British possession of the Cape of Good Hope by various governments under which he served, and to the country, the prosecution of the various voyages to the Arctic Regions which have so characterised the naval history of England during the last forty years of his connection with the Admiralty; and through his services he was commemorated by associating his name with the point of land, Cape Barrow, yet such was the sense entertained of them by those officers who had been engaged in those voyages, that, on his retirement from the post of auditor-general of public accounts, he was given a costly candelabrum, bearing a suitable inscription on the pedestal.

Mr. Barrow was a man of untried industry. The leisure hours afforded by his official employment were devoted to the cultivation of every science and art; and, though his writings in the above-mentioned branch of literature and science circles of the metropolis. He was for a long period a member of most of the leading learned societies of London. In 1808 he was elected a Fellow of the Royal Society; in 1830 he took a leading part in the foundation of the Geographical Society of London, of which some years later he was chosen president. In 1838 he was created a baronet.

In the beginning of 1845 Sir John Barrow, then in his eighty-first year, resigned his office at the Admiralty, and retired from public life. He had as early as 1806 received the interest of a considerable pension of 1000L. per annum, to be deducted from the emoluments of any place he might hold under government. He died almost suddenly on the 23rd of November, 1845, in the eighty-fourth year of his age. Besides the works mentioned above, Sir John Barrow published a "Life of Earl Macartney;" "Life of George Lord Anson;" "Life of Lord Howe;" "Life of Drake;" "Memoirs of Naval Worthies of Queen Elizabeth's Reign;" "Chronological History of Arctic Voyages;" "Voyages of Discovery and Research within the Arctic Regions;" "Sketches of Royal Society and Royal Society Club;" the "Life of Peter the Great;" and the " MUTINY of the Bounty" in the "Family Library;" and his "Autobiographical Memoir," written in his eighty-first year, was esteemed a valuable contribution to the "Quarterly Review," having in all furnished 195 articles to that journal, and he wrote some papers for the "Encyclopedia Britannica," as well as for one or two other periodical publications.

(An Autobiographical Memoir of Sir John Barrow, Bart.; Sir G. T. Staunton, Memoir of Sir John Barrow, edited by J. B. (John Barrow, son of the above article)]

BARREY, MARTIN, an eminent physiologist, was born at Fratron, Hampshire, July 25, 1824. He early manifested for scientific pursuits, led his parents to give up their scheme of a mercantile life for their son, and he studied in the universities of Edinburgh, Paris, Berlin, and other places of Europe and America, and resided for some years in London. He entered warmly into the proceedings of the societies of the Scottish metropolis, and spent most of his...
holidays in geological and botanical excursions on foot among the lakes and mountains. He took his degree of M.D. at Edinburgh in 1833, and in the following year, after a term of study at Heidelberg, he rambled through Switzerland and Chamouni, where, though past the middle of September, too late in the season, as was thought, for success, he went to the mountains and performed many ascensions of the great summits; and Humboldt was so pleased with the narrative of the adventure published by Barry in 1836, that he personally requested him to translate his 'Two Attempts to ascend Chimborazo in Ecuador.'

Martin Barry has the merit of being one of the few physiologists who devoted their attention to the difficult question of animal development and embryology. He began by making himself well acquainted with the literature of the subject, and his friendship with Purkinje, Valentin, and Schwann, brought his knowledge to the test of observation, and acquired that mastery over the microscope which afterwards appeared in the importance and value of his researches.

Having published in the 'Edinburgh Medical and Surgical Journal' for 1836, a translation of the first part of Valentín's 'Manual of the History of Development,' he commenced his investigations into the development of the mammalian ovum and the formation of the blastoderm. "This part of embryological science," he noted, "the results, communicated to the Royal Society of London, were printed in the 'Philosophical Transactions' under the general title of 'Researches in Embryology.' These, as well as his papers 'On the Corpuscles of the Ovary'; 'On the Fetal Membrane'; 'On Fibre,' &c., will be found in the 'Philosophical Transactions' from 1838 to 1842. The most important—the discovery by which he will be best remembered—'Spermatozon found in the blood of a man.' The Royal Society recognized the value of Barry's researches by awarding him his royal medal in 1839, and electing him a Fellow in the following year.

The 'Researches in Embryology' exhibit proofs of the author's skill in the grouping and selection of his facts, and of the perseverance by which they were demonstrated. He explains the formation of the ovum in the rabbit and dog, and in some of the oviparous vertebrate classes from the bird to the fish. He determined the order of formation of different parts of the ovum, and the nature and modes of its growth from the ovicle; and showed that the so-called 'disc of Von Baer' contained a retinacula, or peculiar species of mechanism, by which, as he supposed, the passage of the ovum into the Fallopian tube was regulated. He described the changes that take place in the ovum while on its passage—changes before unknown; and Barry was the first to throw light on this interesting process of animal development. Not till his paper appeared in 1839, was it known that the yolk of the bird had been observed in Batracian reptiles, and true of mammals. It was an important discovery; and not less so that published in 1840—the penetration of the ovum of the rabbit by spermatozoa, through an aperture in the zona pellucida. This at first was doubted; but he confirmed it by further observation in 1843; and it was eventually corroborated by the observations of Nelson and Newport, accounts of which are also published in the 'Philosophical Transactions;' and Professor Bischoff, who had denied the truth of Barry's conclusions, was at last satisfied himself of their accuracy, and accepted them in full.

The views expressed by Barry in his paper 'On Fibre,' are disputed by physiologists. He assumed a spiral structure for the ovum and other organs, and went on to speculative arguments to bear in favour of his opinions; but other investigations show one and the other to be fallacious. His speculations have however tended to stimulate physiological research. Whatever may have been Barry's feeling for his own favourite ideas, his character as an amiable and benevolent man is beyond question. Ample private circumstances placed him above the need of practising his profession; and he devoted much of his time to the poor, chiefly as a house-surgeon and medical officer of the Charity Maternity Hospital in Edinburgh. From 1840 to 1853 he lived on the Continent to recruit his health and eyesight, both having suffered from long and severe study. At Prague he renewed his examinations in anatomy only with Purkinje; with what result may be seen in Müller's 'Anatomy,' 1860. In 1853 he returned to Scotland, suffering much from neuralgia; and having gone to reside at Eccles, in Suffolk, he died there on the 27th of April, 1856. He was a member of the Society of Experts.

Barry was a member of the Royal Society of Edinburgh, of the Wernerian and other societies, and the College of Surgeons in that city. Some of his papers and translations are printed in the Edinburgh or Philosophical Journal; and several of his works were included in the periodicals already mentioned.

BARTON, BERNARD, was born in London in 1784. His parents were members of the Society of Friends, and to the tenets of that sect Bernard Barton always adhered. In 1803 he matriculated at Christ Church, Oxford, at which he entered as a clerk the banking-house of Messrs. Alexander, in whose employment he continued almost to his death. Bernard Barton first claimed public attention as a poet in 1812, by the publication of a volume of 'Metrical Effusions.' This was followed by a volume of 'The Works of William Shakespeare,' published in 1819. Thenceforward as long as he lived he continued to issue at intervals either brief occasional pieces, or, though much more rarely, a poem of greater length and loftier pretensions.

Barry exhibited an amount of scientific and popular facility far beyond that to which his poetic merits would seem to have entitled him. This was perhaps mainly owing to his presenting the then unusual phenomena of a Quaker poet—the title indeed by which he came to be commonly transcribed in his poems, which in the evidently unaffected tone of simple religious earnestness which pervades all his writings, he wrote with ease; and like most easily written poetry, his verses are more characterised by fluency than power. But though often diluted almost beyond recognition by the Chrysalis of Wordsworth's unobtrusive benevolence running through his verses, which render them pleasing to all but the more critical class of readers. Barton was a man of refined habits; a lover of nature, and an advocate of institutions for the advancement of a degree of general education in a very uncommon manner among members of his sect.

His moral character was blameless, and few men in his position of life won so wide and general a share of esteem as did Bernard Barton. Some years before his death he was presented by the University of Edinburgh, with the grant of a pension of 1000l. per annum. He died suddenly on the 1st of February, 1849. Besides the works noticed above, Barton published 'Napoleon and other Poems,' 1822; 'Poetical Vignets,' 1824; 'Devotional Verses,' 1826; 'Household Verses,' 'New Year's Eve,' and numerous occasional verses and poems published separately, and in magazines, annuals, &c.

(Memoir, prefixed to his Poems; Gentleman's Magazine, 1849.)

BASEVI, GEORGE, an eminent architect, was born at Brighton, in 1794. He was placed as a pupil with Sir John Soane, R.A., in whose office he remained for six years. He then made a professional tour through Italy and Greece for three years. His first important work was the design for the high street, another of his latest works, executed by him in conjunction with Mr. Sidney Smirke, it shows that he was rapidly throwing off the trammels of precedent, and giving his fine taste and attainments fuller and freer play. But his manner was neither too broad nor too limited, and the effects unpretending and forcible. Whilst examining, in company with the Dean of Ely, the works in the Bell Tower of Ely Cathedral, the restoration of which was being conducted under his direction, his foot caught in a long stairway which had been removed, and he fell through an aperture on to the top of the arch under the tower, a distance of 40 feet. He died almost instantly, October 16, 1845, aged 51. The Fitzwilliam Museum was finished under the direction of Mr. Cockerell. Basevi's works are numerous.

BASTIAT, FREDERIC, was born at Bayonne, June 29, 1801. He was the son of a marchand, by whom he was
This was reserved for our own day to establish public baths and laundries for the community generally, and for the poorer portion of it in particular. The practical philanthropist early saw that the sanitary improvement of the condition of the poor was a condition of poor health, and he was thus demanding a right to cleanliness, a crusade calling for accomplishment. Medical men, clergymen, city ministers, parochial officers, and all whom either professional duty or benevolence had led to enter the dwellings of the very poor, however their opinion differed in other respects, were at least unanimously agreed that there was a degree of dirt and squalor with which health and morality were alike incompatible. Many remedies for the evil were suggested, and several carried into execution. One little knot of practical men resolved fortunately to give their special attention to the matter of personal cleanliness. It had been allowed by all who were really acquainted with the homes of the very poor, that in their crowded and wretched dwellings and cleanliness was impossible. In such places not only were there the rubbish from personal cleanliness, but to wash and dry clothes properly was quite impracticable. It was proposed, therefore, to see whether the establishment of places where, for a small charge, a warm bath could at any time be had, and where all the conveniences of a family wash were provided, was to meet with popular acceptance. Whether it was or not, a few trials were made. For a trilling cost per hour, would not be gladly accepted by the classes most requiring such conveniences.

The movement was practically initiated by the holding of an influential meeting at the Mansion House, under the presidency of B. B. Cobden, M.P, and resolutions were passed for the formation of an 'Association for Promoting Cleanliness amongst the Poor;' and an active subscription was commenced. The first experiment was made in a wretched locality near the London Docks, where, in an open court, called Glasshouse Yard, Rosemary Lane, an old but spacious building, which had for some time been occupied by sleeping-baths for the homeless poor, was rented and converted into the first 'Free Baths and Wash-houses,' opened in the month of September 1844. A public notice was then adapted, as it could be at a small expense, to the purpose, and furnished with a due supply of tubs and boilers, and with a few baths in various out-of-the-way recesses; and soap and soda, as well as hot and cold water, were provided gratuitously. The number of persons who used the baths increased from day to day, and the success of the establishment was, in the first year, 27,662 bathers and 1,077 washers; in the second year there were 34,584 bathers and washers. This, though the first establishment was not the very small one having been previously started, and with much success, in Liverpool, though without the knowledge of the London Committee. The Glasshouse Yard establishment owed its success solely to its usefulness. There was a strong desire among the ratepayers of the metropolis for one of the worst spots in the metropolis; the building itself was as little united to the purpose as any building well could it; the accommodation was of the most ordinary kind. Yet it at once proved—if proof were needed—that the poorest in that wretched neighborhood would gladly be clean when the means were attainable. In August 1846, a second, and much superior establishment, was opened in George Street, Enston Square; a plot of ground having been liberally purchased by the New River Company, near one of the few reservoirs, with the additional advantage of a free supply of water for the first six months. In the first year there were here some 133,000 bathers and 20,000 washers. This establishment, in which the baths are more varied in price than elsewhere, was still more successful.

The establishment third in point of date was, however, the first in importance and in the value of the consequences which resulted from it. In this the committee first fairly developed their labours. This was, the establishment of the Glasshouse Yard was opened gratuitously, it had been desired that the institution should as soon as practicable be rendered self-supporting by means of a small charge to each person who used it. The committee hoped too, to see the system extended through the kingdom, and 'at a very little cost,' that nothing would so effectually and speedily further that object as to be able to show a Model Establishment, which, while it contained all the conveniences and appliances which those who availed themselves of it could desire, should be in itself all that science, combined with practical skill, could
effect in the economy, suitableness, and completeness of its arrangements. Accordingly, architects and others were invited to send in designs for baths and wash-houses, and a great number of them. The information which could be obtained was collected. The Model Establishment was then erected on a site which had been purchased in Goulston Square, Whitechapel, a very poor and crowded neighbourhood, but of ready access. The building is a magnificent edifice almost entirely novel caused a very large original outlay, and many changes have been subsequently made; but as a whole they had been so carefully considered, and were so judiciously designed by Mr. Prichard Baly, the committee's engineer, that no material alterations had been required. In the present Annual Report of the Committee, we are told that "the general arrangements and mode of construction have been almost universally followed in London and the country." When the character, then, these establishments are pretty much alike. The exterior is usually a plain brick building, with stone quoins and dressings; having a basement, and, in front, a story above it, with a lofty square ventilating and chimney-shaft, somewhat like a campanille in appearance. A brief sketch of the interior of any one will serve to give a general conception of its aim, being understood that there are differences of detail in each.

The baths for males and females are on opposite sides of the building, and separated in Goulston Square by the wash-houses in the offices by the plate-glass window. In both sides are first and second class baths. The apartment in which these are placed is spacious and lofty, covered by an open roof, and lighted in the day by ample skylights, by gas-light at night. The wash-room is usually somewhat more than six square feet, shingled with glass doors, and arranged to carry the height of some ten feet; but the top is open, so as, while insuring privacy, to admit of thorough ventilation. The bath, in some establishments sunk in the ground, in others placed as usual above ground is either of iron enamelled, or of zinc. The first and second class rooms are usually alike in every respect, except that the fittings in the first-class rooms are of a superior kind, and more usually the floor is of the first-class, the door is a door with a key, having a number painted on it; a similar number is painted inside. An index outside enables an attendant to let in either hot or cold water, as the bather may direct. The charge for a first-class warm bath is sixpence, for which two towels, flesh and hair brushes, and a comb are allowed. For a second-class bath the charge is only twopence, but only one towel is allowed, and the bather must provide his own comb and brushes. The baths are in all about the same quantity of water (in most places forty-five gallons, but at St. Martin's much larger), and the bath is invariably cleaned after each person. The most perfect cleanliness is indeed observed in every respect. For a cold bath the charges are respectively threepence for a first-class, twopence for a second-class, and one penny for the regulation cold bath. The baths on the female side are similar to the others, but there is a little more taste in the first-class fittings. At Goulston Square there are only warm and cold baths. At St. Martin's a shower-bath is added. At George Street there are also vapour-baths; and at the more recently constructed establishments there are plunge or swimming baths filled with tepid water. For these swimming-baths the charge is usually twopence for the first, and twopence each person for the second-class. At the larger of the recent establishments there are two swimming-haths—a first and a second class; the smaller places have only one large bath, using it three days a week as a first, and the other three days as a second-class bath.

The baths have everywhere proved exceedingly popular. The second-class baths are, in the summer particularly, always well attended, and of an evening there are generally many waiting for their turns, which are always strictly in the order of arrival.

The number of baths varies, of course, according to the requirements of the locality, and the size of the building. The number of first-class baths, for example, at St. Martin's-in-the-Fields is, twenty-four men's, five women's; of second-class thirty-two and twelve, respectively. At Goulston Square, there are ninety-four first and second class baths. At St. James's, Marshall Street, there are only about fifty of both classes; but there is a swimming-bath. The number of baths in London is over 1,500,000; at St. Martin's-in-the-Fields the number is above 200,000.

The Wash-houses are more remarkable than the bathing-rooms, because entirely unlike what is seen anywhere else. Along the centre, on one side, and at the ends of a large and handsome passage, the soaps, sponges, towels, and other necessaries, the walls being of unpainted slate, and some six or eight feet high; these are the washing-places. At convenient points are the wringing-machines. Along one side of the room (at Goulston Square) is what looks like a range of wide horizontal planks, and have been prepared, to arrange them being one above the other—that is the drying apparatus. A long flannel-covered board is furnished for ironing on. In some of the latest wash-houses a mangle is provided.

Each washing compartment is six feet long by three and a half feet wide by two and a half feet high; the door of each is sunk to the top when the clothes are put in, it is set in rapid motion by a handle which works a few connecting wheels; the clothes at once by centrifugal force arrange themselves around the sides, the water entering by the bottom. The result is that the clothes are carried off by water-pipes: an opening at the foot of the machine shows when the water ceases to flow, and when consequently the 'wringing' is completed, and then the pressure of a lever at once stops the machine. The machine has a rather a heavy-looking frame to it; it is really very light work, and by it three minutes suffice to rid even a thick blanket of its moisture. The Drying-Chamber is a long, chamber, heated by hot air to a temperature above 210°, and divided into numerous smaller chambers, in which the clothes are deposited. Each division of the chamber contains a clothes-horse or maiden, one being allowed to each washer. In ten minutes, or a quarter of an hour, the clothes, unless very heavy or numerous, are quite dry. The Committee have published a table in their Report to show the rapidity with which the drying is accomplished. Some of the results are curious. We may take a single instance as an illustration of the processes we have been following. Three large dirty blankets weighed before being washed 82 lbs. 3 oz.; after leaving the wringing-machine, 12 lbs. 3 oz.; after being dried, 8 lbs. 12 oz. These blankets took twenty-five minutes to dry, at a temperature of 210°. In all other cases the results were similar; establishments, in which the temperature taken when the drying-chamber contained decidedly less moisture than they did when they were received for the "wash." To show the "satisfactory working of the drying-chamber at the Model Establishment, and also in great advantage in the economy of time, trouble, and expense..." to those of the labouring classes who resort to it," the committee give a return of the articles dried there in one week ending January 24, 1853. It is too full for us to copy; but we may state that the number of articles of all kinds, from counterpanes, jackets, and trousers, down to shifts and stockings, was 36,844, belonging to 1373 washerwomen, who occupied 3995 hours in washing, drying, and ironing them; and that the dried consumed only 285 lbs. of coke, which cost under 1s. 6d. in most of the establishments there is only one class of washers; but in some there are both first and second classes, the difference being that the first class have a somewhat larger compartment allotted to each washer, and a third or fourth washing-machine. The charge for the use of these has been described is now generally 1d. an hour, though in a few places it is only 1d. an hour. Where there are both classes, the charge is 1d. an hour first-class, and 1d. second. Soap, soda, &c., have to be bought by the washers. Unquestionably the wash-houses are, according to the size of the establishment; at Goulston Square there are 64 of them, at St. Martin's 56. The average time occupied by each washer at the Model Establishment is two hours and a half; and this is the general average given in London; in some country towns it differs considerably. In
At this time he was alike opposed to Kosuth, with whom however he afterwards allied himself. When, in consequence of the events of March 1848, the Archduke Stephen was created Palatine of Hungary, Count Louis, an old friend of the Austrian chancellor, was not less anxious than Louis de Carné to take part in the hostile struggle now become inevitable. In November 1848 he went to Pesth, to take his seat in the Diet, and was named one of a deputation sent to treat with General Windsichgratz, the Austrian general, who was approaching Pesth with an army. The deputation was not received. The Hungarian government removed to Debreczin, but Count Louis remained at Pesth, where, on the arrival of Windsichgratz on January 6, 1849, he was arrested. After being transferred to Olm, to Ometz, and to Lybach, he was at length brought back to Pesth, where he was condemned by a council of war to be hung. He endeavoured to escape the ignomy of the sentence by destroying himself with a polynard. He did not succeed, but at length the sentence was carried out, October 13, 1849. His body and that of the librarian were consigned to the flames, and his children were exiled.

\(\text{[Novelle Biographie Générale.]}\)

**BATRACHOSPERMEAE.** a tribe of plants referred by some writers to the genus *Batrachophora*; and as it is regarded by Harvey as an aberrant group of *Chlorospermeae* and *Templetonia, passing through *Ectocarpus* to *Melanospermea.* [A] or [\text{A}.] The species have a polysiphonous frond composed of a primary thread, surrounded by parallel accessory ones. The vesicles and terminal or lateral and closed.

The principal genus of this family is *Batrachospermum,* which have got this name from *Bérapex,* a frog, and *Etrico,* a seed, on account of their gelatinous fronds giving them the appearance of the ova of the Amphibia. The species are flexible, and have a gelatinous character. The surface is covered in innumerable little hairs, looking like cilia, which give them a very beautiful appearance under the microscope. They mostly inhabit pure and running waters where the force of the stream is not considerable. On removing them from the water the hairs, which are expanded whilst immersed, collapse, and they appear like masses of jelly without any traces of organisation.

Several species of this genus have been described by Dr. Hassall, as in the neighbourhood of London. *B. moniliformis* is figured in Lindley's *Vegetable Kingdom,* p. 20; and Hassall has figured some of his new species in his *British Fresh-Water Alge.*

**BAVIAN,** a small hamlet in Kaukas, situated on the left bank of the Tchagharian, on the village of Khinnis, which stands on the right bank of the river in about 36° 49' N. lat. 43° 38' E. long. The place has become celebrated in connection with the Assyrian rock sculptures discovered near it by the late M. Roset, French consul at Mosul, and since visited and described by Dr. Layard in his *Nineveh and its Remains,* and in his *Nineveh and Babylon.* The sculptures are carved in relief on one side of a narrow rocky ravine in the Missouri hills, on the right bank of the Goyel, a stream which joins the Tchagharian in the north-west just above Bavian. The sculptures are cut in the face of a limestone cliff that rises perpendicularly from the bed of the torrent. The face of the cliff has been smoothed down into several compartments or tablets, each inclosed in a frame of the living rock, and protected by an overhanging cornice from the water that trickles down the precipice. The bas-reliefs, which are of colossal size and admirable execution, are of the true Assyrian type, and represent gods, nympha, and animals. They have suffered much from the effects of the atmosphere, but still more from the excavation of tombs in the 

\(\text{[E]eadly-scraped flocks, by some people who occupied the country after the Assyrians. The faces of the tablets are inscriptions in the cuneiform character, which were copied by Dr. Layard, and have been translated by Dr. Hincks. These inscriptions recoup the exploits of Sennacherib, and are considered to be of considerable historical importance.} \)
BEAUFORT, REAR-ADMIRAL SIR FRANCIS, K.C.B., F.R.S., &c., late Hydrographer to the Admiralty, is the son of Captain John Beaufort, of the county of Meath, Ireland, and author of Map of Ireland, published with a memoir, in 1792, as well as of some theological publications. Francis Beaufort entered the navy, in June 1787, as a volunteer on board the Colossus 74, stationed in the Mediterranean. He was detailed to the Phaeton, a privateer, in June 1790, and while holding that rank saw much active service, assisting among other duties in the capture of several vessels. In May 1796 he was created lieutenant, and whilst acting as a lieutenant of the Phaeton, 36 guns, he, having under his orders a barge and two cutters, hoarded and took the San Joseph, a Spanish polacule-armed ship of 14 guns and 56 men, which lay moored under the protection of five guns of the fortress of Fuentsizola, near Malaga, supported by a French privateer. While in this service the lieutenant received a wound in his head, and several slugs in his body and left arm; but was recommissioned by obtaining, as a recognition of his skill and courage, a commander's commission. During a cessation from service afloat, he was engaged from November 1798 to June 1804 in superintending the construction of a line of telegraphs between Dublin and Galway. In June 1805 he proceeded as commander of the Woolwich 44 guns, to the East Indies, and was appointed to the Praza, of 74 guns, while a lieutenant, during the campaign of 1807, a very valuable survey. He was afterwards stationed at the Cape of Good Hope, and in the Mediterranean. In May 1806 he was appointed to the command of the Blossom, and the following year with the rank of a lieutenant on the command of the Frederickson's frigate. During 1811-1812, he was engaged in making a minute survey of the coast of Karamania in Asia Minor, but was compelled in the latter year to return home in consequence of wounds inflicted on him by a fanatic Muslimman.

In the course of these services Captain Beaufort had obtained a very high rank, as a scientific as well as a brave seaman, and equally so as a hydrographer and geographer. He was now consequently called upon by the Board of Admiralty to assist in the compilation of the works, in a series of charts, the results of his various surveys. Among other charts constructed by him were one of the Archipelago, three of the Black Sea, including the coast of Asia, and seven of Karamania, these last being accompanied with a "Memoir of a Survey of the Coast of Karamania in 1811 and 1812." In 1817 he published in 8vo, a fuller and more elaborate work on the same district: Karamania; or, a brief description of the South Coast of Asia Minor, and of the islands near thereto; &c., with maps, plans, &c. His labours and scientific merits found their appropriate reward in his elevation, in July 1832, to the post of Hydrographer to the Admiralty, to which important office he imparted new honours, in which he held for 18 years, and during which he continued to hold till he retired full of years and honours on the 30th of January 1855, having very nearly completed his 68th year of service. He was succeeded by Captain Washington, Admiral Beaufort died in Dec. 1857.

In April 1836, Captain Beaufort was appointed Commissioner for Inquiry into the Laws, &c. affecting Pilots; and in January 1845 a Commissioner for Inquiry into the Harbours, Shores, and Rivers of the United Kingdom. He was created Rear-Admiral, Oct. 1, 1846.

Admiral Beaufort, besides his memoirs on the coast of Karamania, &c., contributed papers to the Geographical and other learned societies; and the important collection of Maps of the Society for the Diffusion of Useful Knowledge was executed under his supervision. He was elected Fellow of the Royal Society in June 1814; he was also a Member of the Council of the Geographical Society, a Fellow of the Royal Astronomical Society, a Corresponding Member of the American Geographical Society, &c.

BEAZLEY, SAMUEL, architect and playwright, was the son of a surveyor in Parliament-street, Westminster, where he was born in 1786. In early life Mr. Beazley served as a volunteer, and some of his adventures in the Peninsula and France, which remained to himself, are his own character. Mr. Beazley's chief claim to remembrance as an architect arises from the fact of his having erected a larger number of theatres than any other contemporary architect in the United Kingdom, or in Europe. The Lyceum (both the present one of that name, and the one on its site destroyed by fire in 1830), the St. James's and the City of London theatres in the metropolis were built by him; also two or three in the provinces, and two in Dublin. He likewise furnished the drawings for two in Belgium, one in Brazil, and one in Russia. Mr. Beazley was a founder of the Royal Institute of British Architects (1785), and the colonnade of Drury-lane theatre were also erected by him; and we believe that he executed other works in connection with theatres. His theatres, though not remarkable for any high degree of artistic design, yet possessed the whole of the audacity a tolerably good view of the stage, while their acoustic properties are considerably above the average. Among his other more important works may be mentioned Studdy Castle. For some years before, he had been very extensively employed in constructing the architectural works of the South-eastern Railway Company. The terminus at London Bridge, the stations on the North Kent line, the New Town, Ashford, Kent, the Warden Hotel, and the Pilot House, Dover, &c., have been chiefly planned by him. His theatres are mostly well adapted to their purpose, and like them, they have little other merit.

But during his life Mr. Beazley was not merely known as an architect. He was also one of the most prolific playwrights of the day, having written, it is said, upwards of a hundred dramatic pieces. They were mostly farces, and other light occasional pieces, which were forgotten by the end of the season in which they were produced; but one or two still occasionally reach the stage, and give the audience considerable titillations; but, like his buildings, they appear to have exhibited great mechanical dexterity, and a keen perception of the immediate requirements of the subject. Mr. Beazley wrote two novels, the 'Octariana,' and the 'Ward,' the latter was published during the vogue of the 'Sonnambula' and some other operas. Though apparently so constantly employed, Mr. Beazley was well known in society as a dapper and a cheerful companion. He died suddenly at his residence Tunbridge. The Architectural Review 1851.

BEERERINE. [MATERIA MEDICA, &c.]

BEDALE. [YORKSHIRE.]

BEDWYN, GREAT. [WILTSHIRE.]

BEECHEY, ADMIRAL FREDERICK WILLIAM, was the son of John Beechey, of Hertford, and was born in London in 1766. Having entered the navy when only ten years old, he was engaged as early as 1811 in an action off Madagascar, resulting in the capture of the French frigates Renommé, Clarinde, and Nétrie. In 1818, when the Dorothen under Captain David Buchan, and the Trent under Lieut. John Franklin, were despatched in search of the northwest passage, Beechey sailed with Franklin, with the rank of lieutenant. Lieut. Beechey had already distinguished himself in the burning of the French ship, thehistory, and it was given to his charge to collect and preserve such objects as were practicable, or make drawings of such as were not. This voyage, though unsuccessful in its main object, contributed many useful results, and gave him the satisfaction of accounting them in a narrative of the voyage was published by him in 1843. For the ability displayed as an artist in the voyage he was rewarded by a parliamentary grant of 200l.

In 1816 Lieut. Beechey took part in an expedition under the command of Sir Edward Parry (then commander), which penetrated to 113° 54' W. long. within the arctic polar circle. In 1821 he was commissioned, together with his brother, H. W. Beechey, to investigate by land the coasts of North America to the east of Tripoli. Of this undertaking he published a most interesting narrative, with descriptions of the ancient Syrtis, Pentapolis, and Cyrenaica, with a valuable and detailed chart of the coast, extending from Tripoli to Derna, or from 13° to 28° E. long. After his return home he was appointed to the command of the Blossom, with the rank of commander, and directed to endeavor to penetrate the Polar Sea by the Pacific Ocean and Behring's Strait, while Franklin made the attempt overland from North America. Beechey sailed in 1836, and remained in the service till 1846; the voyage having been only half. The extreme point reached in boats was 71° 23' of N. lat., and 166° 21' of W. long. While at Barrow Point, Franklin was at Point Turnagain, thus they were only 100 miles apart. In 1837 Beechey was appointed to the command of Sir Edward Parry's second voyage, and, though neither advanced. In 1837 Beechey received the rank of Post Captain, and during the summer of this year succeeded in discovering to the south-east of Cape Prince of Wales, and near to Behring's Strait, two most convenient barbours, to which he gave the names of Port Clarence and Port Grantley. After this voyage Captain Beechey remained un-
employed for some time, as his health had suffered; but he occupied himself in preparing and publishing accounts of the various voyages. In 1857, at the year of his return, appeared 'Proceedings of the Expedition to the Northern Coast of Africa, from Tripoli, eastward, in 1821 and 1833,' the 'Voyage to the North Pole' followed; in 1851 appeared the 'Narrative of a Voyage to the South Seas the year before last.'

For his services, he was made Rear-Admiral of the Blue. He died November 26, 1858.

BEES, ST. [CORNwall].

BELDING. [Northwestern].

BELFORT. [Baroda].

BELGIAN CONGO, S. L.

BELLINGHAM. [Northwestern].

BELLOT, JOSEPH RENE, was born at Paris, in March 1828. His father, who, was in humble circumstances, removed to Rochefort when Joseph was five years old. Joseph was placed in the elementary school at that city, and so favourable a report was made by his schoolmaster at the close of his term of instruction, that the municipality at once granted him a demi-nourshe at the College of Rochefort. Here his progress was so rapid as to force the conclusion of his term ended, in his 16th year, and he proceeded to the naval school at Brest; the municipality of Rochefort continued to contribute a moiety of the expense. He was two years at the naval school, and on quitting it took rank as fifth on the list of the whole body of cadets, at the end of his first year. At the close of the second year, he received his commission as "élève de marine" on board the corvette Bréscar, bound for the Ile of Bourbon. It is worthy of remark, as characteristic of Bellot's excellent disposition, that, having been ordered to a private subscription to be assessed to his family the sum of 20 francs a month.

Bellot remained abroad some three years, returning home in November 1847. During this time, while steadily pursuing his private studies, he had, by the diligent discharge of his duties on the lower side of the ship, received the approbation of his superior officers. M. Romaine Desfossés, the commodore, to whom Bellot had acted as aide-de-camp, in his official despatch to the minister of marine, pronounced Bellot to be "the most distinguished élève on the station, . . . . . . . . and in every respect superior to his age and position." Distinguished merit in a young officer is seldom neglected by the French government. For his conduct and bravery in the expedition against Tamatave, Madagascar, in July 1846, in which he had performed the most hazardous services, he was designated as an élève of the first class, and, though under twenty, created a Chevalier of the Legion of Honour; and now on returning home with the high commendation of M. Desfossés, he was raised to the rank of Sub-Lieutenant.

The 18th of December, Bellot sailed in the corvette Triomphe to South America, where he remained for about two years. His conduct here affords a fine lesson for the young officer, whatever service he may be in, and to whatever country he may belong. His strictly professional duties, and they were very numerous, were most carefully and sedulously performed, and he obtained, as before, the warmest commendations from his superiors. But his own time was carefully husbanded and admirably employed. He not only extended his knowledge, especially in hydrography and geography, but taught himself to speak English, Spanish, and German fluently; and, withal gave up much time and thought to what he had come to regard as an important part of an officer's duty—the training of his subordinates. So far indeed did he carry this, that, both here and on the African station, his biographer informs us, "he gave on board the vessel a course of lectures on geometry and navigation for all those seamen who, being intended for masters of trading vessels, would have to pass on their return the examination in theory and practice required by the rules of the marine."

Bellot's thoughts were now turned to a new sphere of operations. The search after Sir John Franklin and his gallant comrades had directed general attention to the Polar regions. A fish is always in demand, and Bellot, his own government would not, as he had hoped, aid in the search, he asked for, and obtained permission to volunteer his services in the expedition fitting out, chiefly at the expense of Lady Franklin, under Mr. Belgrove. He was accepted, and he sailed in the schooner Royal Albert in the beginning of June 1851, holding no declared rank, but really second in command, with the understanding that he was to act as chief officer in case of Captain Kennedy's death. Of this voyage Lieutenant Belgrove was commander, and the voluminous account of the expedition published under the editorship of M. de la Roquette, along with his memoirs. The Royal Albert was ice-locked in Furry Bay for 330 days, and was compelled to return without having obtained any tidings of Sir John Franklin; but the expedition was continued from 1852 to 1854. The latter voyage, however, did not have the desired result; and not having proceeded in the direction indicated for their search, and every man was brought home alive and in good health.

Bellot had displayed in this, as on every previous service, the most intrepid spirit, the most sagacity in the choice of his object, and had secured the hearty good-will of both officers and seamen. In England he was received with an amount of enthusiasm for which he was little prepared, and his own government marked its approbation by raising him a step in rank. But he was not disposed to rest on his laurels. He again obtained permission to volunteer in a new searching expedition, and in June 1855 set out in the Phoebus, Captain Inglefield. They anchored safely in Erebus and Terror Bay, where they were lying the North Star, but its commander, Captain Palles, had been for a month away on an exploratory journey. Captain Inglefield resolved to set out in search of Captain Palles; but the latter returned shortly after Inglefield's departure. It now appeared very desirable to fitted out a vessel especially for the purpose of a searching expedition. It is said that another vessel had been a principal object of the expedition to convey to, Sir Edward Belcher, in the absence of his captain, Lieutenant Bellot volunteered to conduct this perilous undertaking. He accordingly set out with four sailors, a canoe, and a sledge. In 1856, the 28th of May, after forty-two days of ice, about three miles from the shore, off Cape Bowden, they were caught in a gale, became separated, and Bellot, with two of his companions, drifted on a broken piece of ice to- wards mid-channel. After cheering his companions as well as he was able, Bellot crossed to the opposite side of the hummock to see how the ice was drifting. As he did not return, one of the sailors went after him; but he was not to be seen, and he was never seen again. His stick lay on the ground, into which it had had no doubt been driven by the violence of the wind. His companions happily escaped.

Thus, at the age of twenty-six, was lost one of the most promising men who have adorned the French navy. The news of his sad end was received with general sorrow in both countries. In London a meeting was held, at which resolutions, expressive of admiration and regret, were moved and supported by the First Lord of the Admiralty, the President of the Royal Geographical Society, Sir John Herschel, and the French savant and scientific men; and a subscription was authorised for raising a testimonial to his memory. The testimonial took the form best calculated to do him honour. Out of the funds a handsome granite obelisk, bearing his name, was placed in a position on the English Shore, and a portion of each of his five sisters a sum of about 3000L. was appropriated. The French government provided for his two brothers.

(Lemer, Memoir of Lieutenant Joseph René Bellot, &c.)

BELOW'S-FISH. [Ctenarchus].

BELONE, a genus of Fishes belonging to the family Scorpaenidae of the Abdominal Malacostracii. It has a head and body greatly elongated, the latter covered with minute scales; both jaws very much produced, straight, narrow, and pointed, and armed with numerous small teeth; the dorsal fin placed over the anal fin. The species are remarkable for the green colour of their bones.

One species, the Belone vulgaris, is common on the British coast. It is known by various names, but more especially that of Gar-Fish. It was placed by Linnaeus in the genus Esox, and being an inhabitant of the sea, it got the name of Sea-Pike. From the fact of its leaving the deep water in spring to deposit its eggs near the shore in the months of April and May, and thus preceding the mackerel in their annual visit to shallow water for the same purpose, it has received the name of Mackerel-Guide. Its other English names, according to Yarrell, are Greenebone, Horn-Fish, Long-Node, Gorebull, and Sea-Needle. The usual length of this fish is about fifteen inches; it has five dorsal spines, each with numerous minute teeth; the eye is large. The fish is uniformly dark in depth to the anal fin, thence tapers to the tail. The dorsal and anal fins begin and end nearly on the same line. The body is covered with minute scales; the external long rays are nearly as long as those of the centre. The upper part of the head and back is a t 2
greenish blue; the sides and belly are silvery white; the pectoral, ventral, and anal fins white. This fish is taken off the coast of England during the winter season, and Dr. Johnston says it is not unfrequently called a Sword-Fish. It is taken also on the Devonshire and Cornish coasts. The fish are brought into the London markets in the spring, and eaten in considerable quantities. The flesh has the flavour of a hind, but it is not esteemed. Great numbers are said to be taken off the coast of Holland, but they are only used there as bait. Mr. Couch says of the Gar-Fish, that it “swims near the surface at all distances from land, and is seen not uncommonly springing out of its element; it has been so long in such that it will for a long time play about a floating straw, and leap over it many times in succession. When it has taken the hook it mounts to the surface, often before the fisherman has felt the bite; and then with its slender body half out of the water, struggles against the violence of the terrors to wrench the hook from its jaws. It emits a strong smell when newly taken.” In the Ionian Islands, according to Mr. Tonna, it is caught by attaching several lines with floats to a raft. In this way a large number are taken at a very short time. Specimens of this fish have been exhibited in the Aquarium of the Zoological Society, in the Gardens, Regent’s Park.

There are several other species of Bream, some of which are said to attain the length of three feet or more, and to the British are already the Whiting or Bream, its flesh generally is wholesome. (Yarrell, British Fishes: Cuvier, Rame Animal.)

**BELPER [DERBYSHIRE.]**

**BER [IBIZA],** was born at Jarrow, in Austrian Galicia, in 1795. After having graduated in the University of Cracow, in 1810 he entered the military school at Warsaw, directed at this period by the French general Pelletier; and from this school, at the end of two years, he issued as an officer of the horse artillery. In 1812 he served as aide-de-camp in the army under Davoust, and subsequently under Macdonald, with whom he was during the siege of Ham burg. Russia having violated the capitulation, he was forced to return to Poland, residing with his father, who had an estate near Kievin. When the House of Poland was restored, he made his military career, and returned to Russia. In 1819 he was created a captain, and became aide-de-camp to General Bontemps. He was next made professor in a school of artillery newly established at Warsaw. Here he introduced the Polish army the use of the Congreve rocket, and published a work upon this instrument of destruction. Soon afterwards he solicited to be removed from this school, but the Grand-Duke Constantine, who treated this demand as an act of insubordination, had recourse to taunts which condemned him to prison. He was however released, but sent to Ketzik, and placed under the surveillance of the police.

After the death of the Emperor Alexander, Ben obtained his dismissal, and went to reside at Leopoli, in Galicia. There he devoted himself entirely to science, and commenced a work on the steam-engine. When the revolution of 1830 broke out, Ben immediately took himself to Warsaw, where he was at once a major in the Polish army; and shortly afterwards was appointed to the command of a battalion of horse artillery, in which capacity, in the face of a numerous enemy, he displayed all the knowledge of a tactician with the bravery of a soldier. After the defeat of the Polish army he led the remnant towards France, and here he remained for a considerable period in exile, gaining his living by teaching mechanics and mnemonics. He afterwards undertook to raise a Polish legion for Dom Pedro in his revolution, but the attempt proved a failure. He himself repaired to London, where an attempt was made upon his life; the ball aimed at him was arrested by a piece of money in his pocket.

On the commencement of the revolution in 1848, Bem at first attempted to organise the insurgents at Vienna, and afterwards joined himself to the Hungarian party. Charged with the command of an army to oppose the Austrians on the side of Transylvania, he at first experienced some checks, but in March, 1849, he made himself master of Hermannstadt, took Cronstadt, and prolonged the revolution that had been joined by that of Russia, called to its assistance in the previous February. He also compelled the Austrian general, Fuchner, to abandon the Banat and Wallachia. The Austrians rallied in Transylvania; and after attempting in vain to excite the Wallachians and Moldavians to rise, he was attacked and defeated at Segevar by a greatly superior force under Ludener, the Russian general. He however succeeded in re-assembling his forces, and on August 10th again sustained a defeat, in which however he could not retain for want of reinforcements. At the desire of Kosuth he entered Hungary, and on August 8th took part in the battle of Temesvar, in which the Hungarians were defeated. The Austrians, who had taken refuge in the Turkish territories, embraced the Musulman faith, was favourably received by the Sultan Abdul-1-Medjid, and was raised to the dignity of a pasha, with a command in the Turkish army. In November 1849, the exiles of the Turkish army, and several other corps had been ordered to reside, in repressing the sanguinary excesses committed by the Musulman population on the Christian residents. He died at Aleppo, Dec. 10, 1850.

**BEN, NUTS,** the fruit of *Moringa pterygosperma,* from which Ben-Oil, much used in perfumery, is obtained.

**[Moringa.]**

**BENCACA, a genus of plants named by Savii, in honour of Count Bentincas, an Italian nobleman. It belongs to the order **Cucurbitaceae,** and has but one species, *B. cerifera.*

The fruit is described as covered with hairs and a glaucous bloom. It grows in the East Indies. Linandy, in the 'Vegetables of India,' states that it is quite superior to the green melon, and states that it is identical with *Cucurbita pepo.* Anisius says that in the East it is presented at every native marriage feast, and is supposed to insure prosperity to the married pair.

**BEN BOY [ORNAMENT.]**

**BENTINCK, LORD WILLIAM GEORGE FREDERICK CAVENDISH,** commonly known as Lord George Bentinck, was the third son of William Henry, fourth duke of Portland, by Henrietta, daughter and co-heiress of Major-General Bentinck, whose son was married to the late Miss Ebrington of Canning. He was born on February 27, 1802, and though only a younger son, inherited a fortune from his mother that placed him above the necessity of adopting a profession. He however entered the army, and gradually attained the rank of colonel. But his political opinions and profound peace was not calculated to open the way to any ambitious aspirations in that direction. He therefore, when his uncle Canning became secretory for foreign affairs in 1826, became his private secretary, for which he displayed an extraordinary capacity, was treated with great cordiality, had unbounded confidence reposed in him, and it was thought a brilliant political career was opening before him. In 1827, while his uncle was first lord of the treasury, he entered parliament as member for the borough of his birth, however, was defeated in the close of his life. He however did not distinguish himself in parliament at this time, except by a very sedulous attendance: he spoke very seldom, and then not well; but he voted steadily on the side of what were known as moderate Whigs. He was an Emanicipationist at heart, and was in favour of emancipation, but not a supporter of the Reform Bill. On Canning’s death in 1827, Lord George gave an independent support (this means opposing them occasionally) to Lord Goderich’s cabinet, in which his father was in the house, that is, bringing up the minister, but by the close of Lord Ebrington’s motion that defeated the Wellington cabinet. He however continued to support Lord Grey’s government till the secession of Lord Ripon, Sir James Graham, and Lord Stanley (now Earl of Derby), to the latter of whom he was strongly united by the connexion of political opinions and the similarity of pursuits; both being strongly attached to the turf. On the accession of Sir Robert Peel in December 1834, he formed one of the small party nicknamed by O’Connell as the Derby Dilly, “carrying six in a row and playing off the court.” But he now joined the ‘Liberal or House treaty,’ by which it was asserted the adhesion of the Irish members was bargained for by the Whigs, and which ultimately led to the resignation of Sir Robert Peel in 1838, and his successor. It was a common saying at the time, that he would travel by rail to Andover to hunt, and return in time to attend the sittings of the House in the evening; throwing a wrapping overcoat of some kind over his-scarlet hunting coat, and exercising indefatigably the office of ‘whipper-in,’ in which capacity he was known as “the Old Lion.” But in 1843 the free-trade measures began to alienate many
of Sir Robert Peel's supporters; and when in 1846 he wholly
repealed the Corn Laws, Lord George went into the most
violent opposition. Three months after Peel retired, Lord
George abated but little of his animosity, although he
opposed the Whig free-traders who had succeeded him. The
country party, as it was termed, had been taken by surprise,
and knew not where to look for a leader. At length they
selected Lord George, who very unwillingly accepted the
post, but having accepted it, he threw himself into the part
with his accustomed energy in whatever he undertook. He
commenced studying statistics, he spoke on every possible
occasion, he inspired his adherents with boldness, he impeded
the advancing of all constitutional measures. But though clever,
ardent, indefatigable, and too often unspeakable, free-trade
continued its march in spite of his efforts, seconded by those
of his principal ally, Mr. B. Disraeli. He had during all these
political avocations continued his attention to racing and
race-horses, declaring on one occasion that the winning of the
Derby was the "blue-ribbon" of the turf. On the
prostration of the house in August 1848, he retired to
Welbeck Abbey for relaxation; he however attended Don-
caster races four times in one week, at which a horse of his
own breeding won the St. Leger stakes, to his great gratifica-
tion. On September 31 he left the house on foot soon after
four o'clock in the afternoon, to visit Lord Manners, at
Thoresby Park; and sent his servants with a gig to meet him a
mile or two off. Lord Manners was greatly alarmed; search was
made for him; but it was not till eleven at night that he was
found quite dead, lying on a footpath in a meadow a mile from
the house. At the coroner's inquest his verdict was "suicide by
the wounds of the heart." A lengthy life of Lord George has
been written by his friend and follower, Mr. B. Disraeli,
in 1851. (Gentlemen's Magazine; Miss Martineau, Life of Lord
George, 1855.)

BENZENE, LONG. [NORTHUMB.]
BENZIL.
[CHEMISTRY, S. I.]
BENZILIC ACID. [CHEMISTRY, S. I.]
BENZINE. [CHEMISTRY, S. I.]
BENZONIO. [CHEMISTRY, S. I.]
BENZULE. [CHEMISTRY, S. I.]

BÉRANGER, PIERRE JEAN DE, was born in Paris,
August 19, 1790, of humble parentage, and in his earliest
years was brought up by his grandfather, a tailor. He wit-
tnessed the taking of the Bastille, in 1789, and was then
removed to the care of an aunt, who kept an inn at Peronne.
Here he first learnt to read. At fourteen he was apprenticed
to a printer in Peronne. Somewhat later he attended a private
school at Senateur, near Paris, where he was returned to his father at Paris, and having attended some
theatrical representations, resolved to attempt a comedy, and
produced 'Les Heraphroditens.' At eighteen he projected
the writing of an epic, to be called 'Grovis'; this he pro-
posed proceeding for, but had not time. He afterwards
produced verses on sacred subjects, some of which have been
given in the edition of his works edited by M. Perrotin
and published in 1834. These performances did not improve his
fortunes; and, reduced to great distress, he thought of pros-
ceding to Egypt, where Bonaparte then was, and whose first
successes had excited extravagant visions of glory and pro-
spersity among the French population. The return, however,
of some members of the expedition dissipated Béran
gue's dream, and he remained in Paris. It was at this period,
when suffering from his disappointed hopes, and even actual
indigence, that he seems to have resolved to be gay if he
could not be happy, and he produced his 'Roger Bontemps,'
'Le Grenier,' 'Les Guerres,' and 'Le Vieil Habit.' They were
not immediately successful, but in 1801 he published some
poems to Lucie Bonaparte, who promised to ameliorate his
situation. Lucie was suddenly called to Rome. Béran
gue thought himself forgotten; when a letter came from Lucie,
assigning to Béranthor his income as an pension to the insti-
tute, and the employment as an editor, and in 1809 was
appointed a clerk in the secretary's department of the
Academy. His songs were now becoming popular in
every quarter. During the "hundred days" of Bonaparte,
Béranthor, with his music, and in appropriate connection.
In 1813, when he published his first collection of songs, which
were popular throughout France, he was informed that it would
occasion his dismissal from the office he held in the
Academy. He wavered not, and was retained; but in 1821,
when the second collection was published, he was at once
discharged. He wrote more and more poignant satires upon
the government; he was prosecuted, and was sentenced to
be imprisoned and to pay a fine of 10,000 francs. Con
dined more strictly in the prison of St. Cloud, and after
some time permitted some attacks on the faults and follies of
the government, and these remarkable lyrics aided not a little
in accelerating the fall of the Bourbon.

In 1830 the revolution of July would have acted favour-
ably for Béranth's fortunes if he would have given up his
beloved independence. He says, "I was treated with as one
of the great powers; 'near all my friends have become
ministers;' 'unfortunately I have no love of sycophants, and
all compulsory labour has become insupportable.' Béran
gue was convinced that France was not fitted at this time for
a republican government, and he supported the establish-
ment of a limited monarchy. In 1833 he published his fifth and
last collection of songs, containing some of his most striking
pieces. After the revolution in 1848 he was elected in April
of that year a representative of the Department of the Seine
in the Constituent Assembly, by more than 200,000 votes;
but in May he sent in his resignation. It was unanimously
refused; but a week afterwards he renewed it, and it was
accepted.

Béranth continued to write, but did not publish. He was
known to have a large collection of songs, and, he employed
himself also with a 'Biographie' of himself and his contem-
porary fellow countrymen. In 1834 an edition of 'Memoirs of
Béranth' (Mémoires, &c.) was published by his brother-
ner, and Details concerning his Life ('Quarante-Quinze
Lettres,' &c.). In October, 1837, M. Lapointe published
'Memoirs of Béranth' (Mémoires, &c.) in November
appeared 'Biographie of Béranth' (Biographie, &c.);
and in December was published 'My Biography, by
P. J. de Béranth' ('Ma Biographie,' &c.)

The songs of Béранth have deservedly attained a high
reputation, not only in France but throughout Europe. One
charm is their complete nationalitv. The delicate wit, the
subtle satire, the indifferent denunciation, the vivid and
correct pictures, the frequent comicality of situation—are all
truly and exclusively French; and so are the faults that are
sprinkled rather too frequently through them. His command
of language and of metre is such that the significant rhythms
the words always seem to drop naturally into their places;
but this result, as he states in his 'Biographie,' was attained
by him only with great labour.

The whole life of Béranth is very remarkable. He had
become a real power in the state, under the first Napoleon.
Although he felt that there was no hope for the national
freedom of his country while that despotism endurcd, he had
a sincere admiration of the emperor's genius. Consequently
there were no personal attacks in his early songs; and when
a little gentle railing upon externals was ventured—as in
'Lé Roi d'Yvetot' and 'Le Sévaste'—it was laughed at
and applauded even at court. Béranth is considered by
his countrymen as a religious poet; this is not the impec
which an Englishman would receive. But he certainly
does not show by impurity, however he may offend by levity
and want of reverence. The songs for which he was prosecuted
were not attacks on religion, but on its false assumption.
They were considered and invested with the idea of the
conqueror. Béranth has little resemblance to our own
song-writers. He has none of the deep passionate love
depicted by Burns. He never contemplates the happiness of

'Living and being loved by one;' but

'Takes, foresees, rook' Liez ho' in a fashion that jars on English feelings of delicacy. The
passion he describes is indeed rather that which has become
appropriate to the French than to the English. The
contrast to our patriotic singer, Bibdin, is also striking.
Bibdin holds out few incentives to the sailors he addressed
beyond a sense of duty, prize-money, a picture of domestic
happiness with their Nancy, and Greenwich Hospital.
Such encouragements find no place with Béranth. The
glory of France is the most prominent inducement to fight and to die. To our other lyrical poet, Moore, he has some-what more directly presented.

BERCHEMIA, a genus of plants belonging to the natural order Rhamnaceae. Two species, B. colubris and B. lineata, are used in medicine.

BERRILL, WILLIAM CARR, VISCOUNT, the natural son of the first Marquis of Waterford, was born on October 2, 1768. He entered the army early, and while serving in Nova Scotia lost the sight of an eye from the accidental shot of a brother officer in 1786. He served at Toulon, and was in the felucca Pugna, which was taken and burned by Abercromby, and in Egypt under Baird. In 1806, having attained the rank of brigadier-general, he commanded the land forces in the expedition against Buenos Ayres, and was taken prisoner with his command by the conscripted army which escaped shortly afterwards. In 1807 he commanded the force which obtained possession of Madeira. In 1808 he arrived in Portugal with the English forces, and to him was confided the organisation of the Portuguese army, including the militia. This he effected so completely, that the Portuguese troops, throughout the Peninsular war, showed themselves worthy of fighting by the side of their British allies. On May 8, 1811, he invested the fortress at Badajoz, and on the 16th invested Seïnal Alberca. At the battle of Salamanca on 22nd July, 1812, he was wounded, and in the battle of Vitoria and Bayonne, on the 10th of April, 1814, he arrived and covered the heights before the victory of Albuera. His gallantry and bravery had been created a Portuguese field-marshall, Duke of Elvas, and Marquis of Santo Campo; and he was now created a British peer by the title of Baron Beresford. In the same year (1814) he was sent on a mission to Brazil: he returned in 1816, and after a short stay in Portugal, he repatriated to Brazil again. On his return he resumed the command of the army of Portugal, at the request of the Portuguese government, but resigned it at the end of a few years, not approving of the efforts then being made to establish a constitutional government. On his return to England in 1833 he was created Viscount Beresford. From 1828 to 1830 he was master-general of the ordnance. He continued to take an active part in politics, being strongly attached to the Tory party; and in 1839, in consequence of assisting in forwarding English troops for the support of Don Miguel, he was deprived of his rank as Portuguese field-marshalm. In 1835 he married Louisa, his cousin, the daughter of the archbishop of Tavarn, and the wealthy widow of Thomas Hope the banker, but left no issue. He died at Bedgingbury Park, Kent, on January 8, 1864. At the time of his death he was governor of the Royal Military Academy at Woolwich, and governor of the island of Jersey.

The family of plants belonging to the natural order Aurantioceae. B. Konigii possesses stomachic and tonic properties, and an infusion of the leaves is used against vomiting. The green leaves are used raw in dysentery; the bark is internally and externally remittent.

BERKELEY, a genus of Dicotomaceae, named by Graville, in honour of the Rev. M. J. Berkeley, distinguished for his researches in cryptogamic botany. It belongs to the suborder Nonglueae, and is characterised by having linear frustules included within tubular frustules, numerous, filamentous, which are free at one extremity, but have the other immersed in a gelatinous tubercle. B. fragilis is found parasitic on Zostera marina, and some of the smaller alga being on the abaxial coast. B. Adriatica has been found on the coast of the Adriatic.

BERMONDSEY. [Surrey.]

BERTHOLETLA. [Materia Medica. &c. 2.]

BERRILLUS (or BENZEL), JQNS JACOB, one of the most distinguished modern chemists, was born August 20th, 1779, at Wissingenda, a village near Linkoping, in East Gothland. Beyond the fact that he received the elements of learning from his father, who was parish schoolmaster—a functionary of some consideration in Sweden—and that he was sent at the age of twelve to a school, he never made any public account of his early years. At the age of seventeen the youth entered on the study of medicine at the university of Upsal, and attended the dull lectures on chemistry delivered by Alfred Berzelius. So little care had he to render scientific instruction clear to the mind, that Berzelius had to discover and investigate facts and draw conclusions for himself, and soon became remarkable for his diligence and discernment. As an instance of the way in which he was led into chemistry, let me relate what I laughingly to relate in after life: "—Alfælius first gave me sulphate of iron to calcine in a crucible, for the preparation of colochofer: ' Any one may do work of this kind,' I replied; ' and if this be the way you are to teach me, I may as well learn it by rote.' "—"Oh no! your next preparation shall be more difficult." On the next, occasion I got cream of tartar to burn, in order to make potass, which so disgusted me, that I vowed never to ask for any further employment." But he continued to attend night classes, and after a while he was sent to Berzelius' laboratory every day, although by the rules pupils were entitled to admission but once a week, his masters offering no opposition. Ekberg was, however, vexed at times that the young man did not see the fun in his chemical experiments. "I preferred," said Berzelius, "to endeavour to instruct myself by reading, meditating, and experimenting, rather than question men without experience, who gave me replies, if not evasive, at least very little satisfactory on the subject of phenomena which they had never observed." In 1796, after two years' study, he left Upsal, and engaged himself as assistant to the physician-supintendent of the mineral springs at Medevi, a watering-place much resorted to by the Swedes. Here with his habitual diligence he worked another year, and in 1799 published a small paper embodying the results. This was the first of the long series of papers that remain to illustrate his fame. In 1804 Berzelius returned to Upsal, and took his degree of doctor of medicine. He published" Researches on the Effects of Galvanism on Organised Bodies," a work which exhibits much of his sagacious insight and painstaking. Davy, who was born in the same year with the illustrious Swede, had made known his experiments; and although Berzelius, taking up the subject, found a wonder of phenomena, materially widened his applications. His growing reputation gained for him, on his going to reside at Stockholm in 1805, the post of assistant to Sparrmann, professor of chemistry, and Davy, who had asked admission to Gooch's second voyage of discovery. The emoluments were so scanty that Berzelius had at times to practice medicine to eke out his resources. In 1806 he succeeded to the chair, and in the same year, jointly with Hisinger, he commenced the" Afhandlingar i Fysik, Kemi, och Mineralogie," to which during the twelve years of its existence, he contributed forty-seven original papers. This periodical was at once translated into German, and subsequently into French, and generally prized for its trustworthy elucidation of chemical principles. This however, but a small part of his work: in 1812, a young man took: he set to work to revise the labours of his predecessors, accepting no conclusion that did not admit of the clearest demonstration. His skill as an analyst is described as singular; and when Dalton was about to give his views he, by innumerable analyses, established the laws which regulate chemical combinations, and reduced them to a form so simple as to give them a twofold value. "When confronted with laws once well ascertained," says an eminent foreign writer, "it became possible to combine the results of the analyses—even to foresee a great number of combinations then unknown—and to carry into every operation an accuracy previously thought altogether unattainable." By his elaborate examinings and experiments with the salts and going through the whole range of elements, including the products of organised existence, Berzelius anticipated Dalton in some of his conclusions, and afterwards found a perfect agreement between his results and those of the Manchester philosopher. His knowledge of the laws of definite combinations enabled him to elucidate the nature of minerals, and to show at the same time, by the composition of the minerals, the universality of the laws. He helped indeed to bring the atomic theory to perfection, and introduce it into science. He framed moreover an electro-chemical theory, and published" Lectures on Animal Chemistry," a work filled with rare proofs of original research and clear perceptions on a branch of science then least understood. On the publication of this work Berzelius was not able to pay the expenses of two hundred dollars a year, to enable him to better prosecute his labours. In 1807 he joined with seven leading members of the profession in establishing the Medical Society of Stockholm, and all the following year he was admitted a member of Sciences of Stockholm. In 1810, being then at the age of thirty-one, he was elected President of the Academy;
The life of Bernhard Senior became a most important instrument in the analysis of inorganic substances. A translation of his treatise on the subject appeared in English in 1811, and it was the first edition in the chemical language.

The question of the origin of the chemical elements and the examination of minerals. There was scarcely a question that he did not bring to the test of experiment, and reduce to its proper place in science, as may be seen in his great work 'Lehrbuch der Chemie,' which has been translated into several editions, and as many translations. The last was published at Paris, in six volumes, octavo, in 1845-1850.

In 1832 Senior resigned the professorship which he had held for twenty-six years; but still kept on with his scientific labours. In 1836, four of his works were published by subscription; and the king of France, in a letter, expressed his appreciation of the work. It was with regret that he was deprived of the chance of carrying on his labours; and he died in London on the 22nd of July 1874. His father was a civil officer (justizrat) under the Prussian government; his mother a dervish's daughter; and there being a family of nine children to rear on but narrow means, the future astronomer received only an ordinary education. Among his earliest manifestations was a dislike of classical literature, and a love for arithmetic. His quickness in calculation led to his being aridoted at the age of fifteen as clerk in a mercantile house at Bremen. Here he showed himself diligent to fulfil the duty of his office; but lay immediately before him, who it might be, and this remained his especial characteristic. The hope of being offered the post of supercargo on a foreign voyage was then his stimuli; and to qualify himself for this responsible office he began to study navigation, and soon all his spare hours, chiefly in the night, were devoted to it. There was no longer the same clerical or commercial pursuits, or in the hope of a voyage. And now appeared a trait that marked his character through life—turning theory or knowledge to positive and practical nesets. With a rude wooden sextant made by a carpenter, and a common clock, he began to make time-observations; and having observed the oscillation of a star by the moon, he got thereunto, to his great joy, an approximate latitude of Bremen.

This was one of the successes that galden the heart of the student, reported in a letter to a friend. From this time his progress in astronomical studies was surprisingly rapid. While still a clerk in a counting-house, he had formed designs of original inquiry, such as are expected only of those who have thought for themselves. Bessel's work on Halley's comet was the result of these inquiries. The idea of a planet in the regions of Neptune has been published by Olbers, according to the theory of that philosopher, as a planet located in the region of Neptune. Bessel's work in this respect was the result of his observations, and he published it in 1845. The new planet was discovered by Olbers, and named the Bessel's planet.

Bessel was one of the first to observe the parallax of the fixed stars, and he published his results in the 'Journal of the Royal Astronomical Society,' and in the 'Verhandlungen der Königlichen Akademie der Wissenschaften zu Berlin.' His work on the parallax of the fixed stars was the result of his observations, and he published it in 1845. The new planet was discovered by Olbers, and named the Bessel's planet.

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The king of Prussia having resolved to establish an observatory at Königsberg, Bessel was appointed director in 1810, and roused himself, he supervised the long and arduous mounting of the instruments, fulfilling at the same time the associated duties of professor of astronomy and mathematics in the university. The establishment, which was finished in 1813, remains no less a monument of his skill and earning power than the man; it sufficed amid the distractions of war. Observations were published in the same year, and have been continued ever since with incalculable benefit to practical astronomers.

Settled in a congenial home, Bessel married with the utmost happiness. His wife was the daughter of Dr. Hagen, a learned man who had been her son and two daughters. And now, what he had done for the comet observations of 1607, he—also at Olbers' suggestion—undertook for Bradley's Greenwich observations, which, first published in 1814, but little regarded by the astronomers of the day. He had begun the task of digestion and reduction in 1807, and applying himself to it as he had numerous avocations admitted, brought it to a close in 1818. The results of this long-continued labour have been for many years before the world in a folio volume, entitled 'Fundamenta Astronomica.' This work, published when the author was in his thirty-fourth year, is of such a nature that even grave philosophers can scarcely speak of it in sober terms; and it is not fitting to Englishmen, being based on the twelve years' observations of Bradly. The book indeed cannot be over-praised. In the words of a scientific report—

"Besides elaborate determinations of all the principal elements of the reduction, the errors of the instruments, the height and inclination of the body, the proper motion, processes of the proper motion, it contains a catalogue of the mean places of 3292 fixed stars, observed between 1760 and 1803, with the best instruments in existence at that time, and reduced to the epoch of 1760, with a precision and accuracy of which there was no previous example. It now furnishes astronomers with the best existing means of determining all those data which can only be deduced from a comparison of observations made at considerably distant intervals of time, and which must be regarded as having been the principal improvements which have been made in astronomy since the date of its publication."

Schumacher's note...remarkable. One may almost assure that one exact and able calculator is capable of doing better service to astronomical science than two new observatories, in this case found its verification.

Bessel's reputation was established. In 1822 he was elected a foreign member of the Astronomical Society of London, and later of the Royal Society; and the scientific societies on the Continent gave it a signal to enrol him among their associates. The king of Denmark conferred on him the order of the Dannebrog; and from his own sovereign, whose life was his steady friend, he received the order of the Civil Merit of the Red Eagle, third class of the Councillor; and the Berlin Academy awarded him their prize for his paper on the precession of the equinoxes.

Bessel's labours have been so numerous that anything more than a bare enumeration of them is scarcely possible. He improved the method of finding longitudes. He determined the length of the seconds' pendulum at his own observatory, and so perfectly, as to establish an epoch in the history of pendulum experiments. He showed that in all former observations an essential cause of error had been overlooked, namely, the mass of air dragged by the pendulum in its oscillations; and that the amount of consequent disturbance would have to be calculated for every pendulum. He investigated all the causes of error in astronomical instruments, leaving nothing unaccounted for, till he surpassed all his contemporaries in his knowledge of the theory of instruments. He employed to determine the Prussian standard of length; and in connecting the geodetical surveys of Russia, Prussia, and of the west and south of Europe; and displayed in these, as in his other labours, rare ingenuity in devising new methods and avoiding causes of error. At the same time he measured an arc of the meridian of Königsberg himself, or of his observatory, over the whole subject into view, he investigated the surveys of the British government in India and elsewhere, and of the French from the Belgian frontier to the Mediterranean, shrinking from no toil that might aid in the accomplishment of his object. The result of the investigation had been calculated and allowed for by four independent geometers; but Bessel, not satisfied with this, "actually recalculated the whole of the work by his own method, producing a result agreeing with the mean of the four determinations allowed for, and established the rectitude of his method, which had been tried on for three years a series of observations on the star 61 Cygni, to determine if possible the annual parallaxes of a fixed star—a task which had been the ombroprism of science. Thanks to his marvellous skill and delicacy of perception, he found an error in the parallax of the star! This is almost inconceivably small, only 30-100ths of a second, astronomers agree in considering it as demonstrated. By observations of other fixed stars, Sirius and Procyon, he "thought himself authorised to announce the want of nuance' in parallax."

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More trustworthy guides than Bessel could not be followed; to his example the present excellence of astronomical science in Germany is due. He was a copious writer; the more remarkable, as his writings exhibit proofs of so much profound research, as of variety of attainments. His "Tabulae Regiomontanae," which may be regarded as a supplement to the 'Fundamenta,' &c., appeared in 1830. Nearly two hundred papers, neither short nor unimportant, in the 'Astronomische Nachrichten,' bear his signature; and the 'Handbuch' of the Berlin Academy and in scientific journals, some of which are named above, he published also two volumes of 'Astronomische Untersuchungen,' and, as is said, left a third in preparation, on the causes of the precession and nutation, and honored in a way accordant with his desert. There is reason to believe that on his return he intended to investigate the problem which, in the hands of Adams and Le Verrier led to the discovery of Neptune. The preliminary reductions were made; but the failure was due to a young man of great promise, who died in 1841, and the approach of disease of a very painful nature upon the astronomer himself, stayed his inquiring spirit. His sufferings became...the expedition to the Great and to the Fangus growth in the abdomen. He died on the 7th March, 1846, at the age of sixty-two.

BETEL-NUT-PALM. [Asa.]—BETHEAM, SIR WILLIAM, was born in 1779 at Standbroke in Suffolk. His father was the Rev. William Betham, author of "Genealogical Tables of the Sovereigns of the World," folio,1795, and of a "Baronetage," in 5 vols. 4to published in 1801-1805. Although young B...thought to be...superseded him as Ulster King of Arms in 1820. Mr. B...was appointed Genealogist of the order of St. Patrick in July 1815, on which occasion he was knighted. He also received the appointment of Deputy Keeper of Records at Dublin; an office...have under his control a large number of records, of which he availed himself to form a...extending to 40 large folio volumes. Sir William was like...diligent collector of old manuscripts connected with Irish history and antiquities: his collection was purchased by the state in 1831, and...a member of the Irish Academy, and soon after became its foreign secretary, which office he held till 1840, when he resigned it in consequence of the council refusing admission in the 'Tras...of him amidst the instructor, and some of his...variety of very singular and wholly untenable character. For a long series of...interested himself in the...collected, and he fancied that he had discovered traces of the...early days of his father, who...members of the...hypotheses...considered Bessel, not satisfied with this, "actually recalculated the whole of the work by his own method, producing a result agreeing with the mean of the four determinations allowed for, and established the rectitude of his method, which had been tried on for three years a series of observations on the star 61 Cygni, to determine if possible the annual parallaxes of a fixed star—a task which had been the ombroprism of science. Thanks to his marvellous skill and delicacy of perception, he found an error in the parallax of the star! This is almost inconceivably small, only 30-100ths of a second, astronomers agree in considering it as demonstrated. By observations of other fixed stars, Sirius and Procyon, he "thought himself authorised to announce the want of nuance' in parallax."

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tion of the Celtic races with several of the most remarkable
racial events of antiquity. His first separate antiquarian publica-
tion, "Irish Antiquarian Researches, or Illustrations of Irish
History," 1826-7, contains many of his peculiar views; but
they then appeared in full force in a two principal works of
his class, the titles of which will sufficiently indicate the
character of his notions: the first of these was entitled
"The Gael and Cimbri; or an Inquiry into the Origin and
History of the Irish, Scotch, and Celts," 1827; and the
other, "The City of Cimbri and Gauls, as described by
Cato, and illustrated by登入s," 1828. In 1830, he
stopped the expansion of his opinions was not arrived at till
some eight years later, when appeared his "Eturia Celtica,
Essay Historical and Antiquities Investigated," or the
last volume of his "Celtic system," in which he identified
"the Chris-Celt, and both shown to be Phthiotic," 2 vols.
In 1832, he also contributed numerous papers on Irish
Antiquities to the "Transactions of the Irish Academy,"
which have their value unfortunately greatly lessened by
his strange want of critical discernment. Sir William was
deemed a Fellow of the Society of Antiquaries, London, in
1825, but only two or three papers by him were printed in
its "Archaeologia." 

In his own proper line of research Sir William was a far
more successful and able guide. Besides several genealogical
memoirs, and a valuable work on "Parliamentary and Feudal
Diplomatics," Sir William published in 1834 a able and learned
"Treatise on the Origin and History of the Constitution of
England," and in 1836 another, "The Churches of England, and
the State in the 17th Century," from which he was induced to
write his "Czech, and other Religious Tribes," 1837, 8vo.

For many years before his death Sir William occupied a
prominent place in the general and literary society of Dublin;
and he was looked up to as a leader in most of the religious
and charitable as well as the literary and scientific move-
ments of the time. Evidently courteous to all
who sought his advice or assistance, and always ready to
place his stores at the service of the historical or antiquarian
inquirer, his death, though at a ripe old age, was generally
regretted. He died at Dublin, October 22, 1850, aged
eighty years and six months.

BETHANY, a village 3 miles E. from Jerusalem, on the
road to Jericho, at the eastern base of the Mount of Olives,
was the scene of the raising of Lazarus from the dead. It is
located in the hill district of Annach (the Village of Immus).
(Bohn's, Biblical Researches; Dictionary of Greek and Roman
Geography.

SHOPAL. [BoPAl]}

BICKERSTAFF, ISAAC, was born in Ireland probably about
1726. He was one of the pages of Lord Chesterfield, who became Lord-Lieutenant of Ireland in 1746. After-
wards he became an officer in the marines, in which service
he continued until forced to quit under circumstances of a
highly discredit able nature. He is known as the successful
author of a number of light comedies and musical pieces
produced under Garrick's management, of which some yet
remain in possession of the stage. The principal are—"Love
in a Village," 1768; the "Maid of the Mill," 1768; "Love in the
City," 1770; "The Cog" (a burlesque on Shakespeare's
"The Hypocrite," 1768; "Lionel and Clarsissa," 1769; "The
Pallock," 1769; "The Captive," 1769; "He Would if He
Could," 1769. His last piece, "The Sultan," was produced in
1757. The music to many of these pieces was composed by
Charles Dibdin. The time and manner of Bickerstaff's
death are uncertain: all that is known is that he withdrew
to the continent, and died in obscurity. (Biographia Drama-
tica: Thespian Dictionary.

BICKERSTAFF, EDWARD, was born March 19,
1756, at Kirkby Lonsdale, Westmorland. He was the fourth
son of Mr. Henry Bickerstaff, a surgeon of that town, and
the younger brother of the late Lord Lonsdale, Master of the
Rolls. He received his early education at the grammar school
of Kirkby Lonsdale, but was removed thence on receiving a
Here he remained for six years, when he was received into
the office of Mr. Blesland, a London attorney, as an articled
clerk. Having completed his term of five years, he entered
into partnership with his master, and on his death married
and commenced business as a solicitor at
Norwich in 1812.

The business soon became a flourishing one, and Mr. Bicken
staff, in a few years, had become deeply impressed with the importance of religious
truths, and he soon took a prominent part in the various
religious movements for which Norwich was becoming cele-
larized. The Norwich Church Missionary Society was founded
by him, and he was active in promoting the operations of the
Bible Society, and several other religious societies in that
city. He also wrote and published, in 1814, A Help to the
Study of the Scriptures, which in its enlarged form has
been extensively used. He also had an enormous circle of his own strong religious
feelings, aided perhaps by an acquaintance he had formed with Mr. Pratt, Mr. Budd, and some other leading clergyman
of the "evangelical" section of the church, led him to desire
honor to himself and in the ministerial office—a desire
which those who knew him best believed to be the true
spiritual end of Mr. Bickerstaff was, December 10, 1815, ordained a deacon
of the Church of England; the bishop of Norwich having
been induced to dispense with his case with the usual university
examinations, and to admit him as a member of the Church
Missionary Society were anxious to obtain the services of Mr. Bickerstaff to proceed on a special mission to inspect and re-organize the stations of the society in
Africa, and to act afterwards as their secretary. A fortnight
before the Bishop of Gloucester admitted him to full orders,
and he almost immediately departed with his wife to Africa.
He returned in the following autumn, having satisfactorily
accomplished the purposes of his visit.

He continued in the sessions discharge of the duties of his
secretaryship, and after fifteen years, organized new and
visiting old branch associations, directing the studies of the
missionaries, continually advocating the interests of the
society in the pulpit and on the platform, as well as with
his own active energy and influence, was through all parts of the kingdom, acquiring a constantly
increasing amount of influence and popularity in what is
commonly designated the religious world. At the end of
1830 he resigned his office, and also his ministerial charge
to the Clerical Mission. In 1831 he went to Watton
in Hertfordshire. At Watton, Mr. Bickerstaff spent the
remaining twenty years of his life. But his labours were
by no means bounded by his parish. He was during the
whole of that time in constant request as the advocate, by
sermons and speeches, not only of almost every other religious society connected with
the church, or in which, as in the Bible Society, and the Evang-
elical Alliance (of which he was one of the founders),
churchmen and dissenting associates, and in the promotion
during his residence at Watton a constant succession of
religious publications, which were for the most part read
in the circles to which they were chiefly addressed with
the greatest avidity. Indeed it may be said that during
most of these later years of his life Mr. Bickerstaff
was one of the most influential and generally popular clergy-
man of that section of his brethren among whom he was
classed.

During this period he took a very decided part in all those
measures which he regarded as having a direct bearing on the
religious condition of the country. He was especially earnest
in opposing the Maynooth grant, and in calling for its with-
drawal; and he was equally zealous in denouncing the spread
of French Jacobinism in Ireland and in the British Empire in
England; yet his opposition was free from all personal bit-
terness, and his influence was directed to softening the
asperities of religious strife. In his later years he mani-
fested a growing interest in the study of prophecy. The
unfulfilled prophecies were made the frequent subject of his
discourses, and he published several pamphlets and tracts
and three or four elaborate treatises in elucidation of the
prophetic writings.

His principal works besides the "Scriptures Help" already
noticed, and a large number of sermons, tract, &c., were:
"The Christian Student;' "A Treatise on the Lord's Supper;' "A Treatise on Prayer,' "Family Expositions of the Epistles
of St. John and St. Jude, ' "A Treatise on Baptism,' "The
Signs of the Times, ' "The Prophecies of the Catholic
Christ,' "The Restoration of the Jews,' "A Practical Guide
to the Prophecies,' &c. His collected works have been published
in 16 vols. 8vo. Among his literary labours ought to
be mentioned the "Hymn-book which he compiled, and the
Christian Family Magazine," which he edited, and which
extended to fifty volumes.

Mr. Bickerstaff was in 1841 attacked by paralysis, the
result of too prolonged mental exertion. He recovered
from this attack, and resuming his labours, proceeded to a meeting of the Evangelical Alliance, thrown
from his chaise under a heavily laden cart, the wheels of
which passed over him; but though dreadfully injured he
was after a time restored to health and activity, and survived

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It was also Reid professor of music at Edinburgh; and in 1848 was elected professor of music at Oxford University. He died April 30, 1856, aged 75. Sir Henry had heavy domestic trials, and he was not predestined, nor made for business; so that his later years were clouded by much anxiety and suffering.

Bishop was one of the first English composers of modern times. Had he written less he would have written better; but he was too inartistic a man to keep to one style. He never retain a permanent place on the stage, and his elaborate imitative philharmonic cantatas have long been forgotten, much of his chamber and concert music—married as it so often was to words—stands exposed to the ridicule of the public ear, and will indeed most likely be still popular when many far more pretentious pieces of foreign as well as home growth shall have passed away with their novelty. Many of his songs and glees have the truest inspiration of that strain of music—flowing, vivid, graceful, and free from all affectation. (Dictionary of Musicians; Athenæum, 1855; Gentleman's Magazine, 1855.)

BISHOP'S AUCKLAND. [AUCKLAND, Bishop's.] BITTLE, in Turkish Armenia, situated at the southern extremity of a long rocky ravine which separates the Kurk Mountains from the Nirmrud-Dagh in a deep valley traversed by the Bittel River, one of the head waters of the Fugia, a distance of about 120 miles S.E. from Erzrum, and E. of Bajaz, S.W. from Bitlis. Three ravines each traversed by a stream open into the valley, one already mentioned from the north-west, another from the west, and a third from the east; and at their junction is a great valley the termination of which is 5156 feet above the sea. In the centre of the town rises an abrupt rock 50 or 60 feet high, on the summit of which are the ruins of a castle, the residence of the former Begg of Bittle. The only access to the castle is by a narrow passage, the exit from which is defended by gates. The town wall which runs round the edge of the rock, and is 30 feet high above its level platform, is solidly built and loopholed, but within this inclosure there is nothing but a heap of ruins. At the eastern base of the castle rock are the bazaars, which are large, dark, ill-built, and dirty, but well frequented, and generally much crowded, as Bittle is one of the chief marts for the imports and exports of Armenia and Kurdistan. The bazaars are lighted only by perforations in the roofs, which is termed over and used as a highway for foot passengers. Near the bazaars and on the banks of the river are the slaughter-houses, haunted by mangy dogs, and reeking with offensive effluvia. The streets run along the streams and up the ravines, giving an irregular and straggling appearance to the town. The houses are for the most part built of wood, with one or two rooms deep, and are interspersed with numerous orchards and gardens, which smile in singular contrast with the bare limestone mountains that rise on every side to the height of about 2000 feet above the valley. The streams are crossed by footbridges, and it is impossible to afford a ready passage from one part of the town to another.

The houses are all built of stone and flat roofed. The best of them stand high up the declivities, and are ornamented with large arched windows, trellis-work, and porticoes. The stone used in building is a soft volcanic rock which abounds in the neighbourhood, especially in the north-west ravine; it is cut into square blocks which are cemented with mud; only a few of the houses are pointed with lime cement. There are three principal marts of commerce: a market of three mosques with minarets, twelve tukyevs, or convents of howling Dervishes, and four Armenian churches. The population of the town consists of about 2000 Mohammedan, 70 Armenian, and 40 Jacobite families. The principal building consisted of the fortified residence erected by the Beg of Bittle 1836, on the level summit of a mountain spur that runs half way across the mouth of the eastern ravine, and is 5475 feet above the sea. It is a rude but extensive structure, consisting of a quadrangle of two stories high, built round a court which is roofed with gables. At the four corners are four covered stables and store-houses; the upper rooms are entered from an open gallery overlooking the court, and are used as sitting and receiving rooms, harem, &c. The windows are all set in the roofs, or open on one side at the base of the building, and command extensive views. From this rising cascade, as it were, to the west and the eastern ravine, Sheriff Beg held Bittle and its territory (containing 80 villages, and forming about one-third of the pashalic of Muhub) in defiance of the Sultan.
for several years. The position of this fortress as given in the "Royal Geological Journal," vol. x., is 38° 23' 54" N. lat., 42° 46' E. long.; on the map in Dr. Layard's "Nineveh and Babylon," the town is placed 36° 20' farther east.

In point of trade Bitlis is an important place. The exports are chiefly galls, honey, wax, wool, and gum tragacanth from the mountains of Kurdistan and Armenia, carpets and cotton stuffs woven in the town and neighbourhood, and dyed here in the same manner as the rich ones of Damascus, for they are made from mountain herbs, and from indigo, yellow berries, and other materials which are imported. The raw cotton used in their manufactures is brought from the districts of Kharab and Shihok (which shallowly is called Shiah), (which it is said is furnished from Khar, in Perimia. It is spun by hand; and several hundred thousand short heavy calico pieces are manufactured throughout the country, of which Bitlis is the centre, and sent here to be dyed. The favourite colours among the Kurds are a dull red, and a bright yellow mingled or striped with black. The carpets are of a rich soft texture, with patterns displaying considerable elegance and taste; they are much esteemed in Turkey. Manchester goods, including unbleached calicoes, shawls, and prints; gay-coloured silks and satins, woolen clothes and coarse cuttersy are comprised in the list of British goods sold in the bazaars. The manufactures of Damascus, Aleppo, and Diyar-Bekr are more extensively used.

Bitlis is said to be an ancient place. Until lately it was governed by Kurish Begs, who were but little under the control of the Porte. Sherif Beg, the last of these lawless chiefs, was exiled to Constantiopolis in 1843, after the subjugation of Bitlis by the Persians, and the town was recovered under the Pashas of Mussul.

BIVALVE, a name applied to those forms of Shell-Fish which have two shells, or valves, in contradistinction to those which have one shell, and which are called Univalves. [Mollusca.] Before entering into a study of their forms, which are well known as it is at the present day, the Barnacles and Sea Acorns, which have several external valves, or shells, were referred to the Mollusca, under the name of Multivalves.

BLACK JACK, the name given by miners to the Sulphur of France.

BLADDER. DISEASES OF. [Surgery, s. 2.]

BLAINVILLE, HENRY MARIE DUCROTAY DE, a distinguished zoologist, was born at Arques near Dieppe, September 12, 1776, of a noble and ancient family. He went first to the military school at Beaumont-Auge, being destined for the army; but left it suddenly in 1796, and, as is said, shipped on board a channel cruiser, and took part in seedy engagements with English vessels. Afterwards he entered the artillery, and was sent to the school of philosophy, in which he was elected assistant in 1798, but obtained exemption through a partial stiffness of the right arm caused by an accident. He remained at Paris without any definite plan of life, occupying himself in a desultory manner by attending lectures on the natural sciences, and by drawing zoological figures. In 1800 he became very expert. He had reached the age of twenty-seven, when, having heard one of Cuvier’s eloquent lectures at the Collège de France, he resolved on devoting himself to the science of comparative anatomy, and at once entered as student in the School of Medicine. Here he took his degree of Doctor of Medicine in 1806, after three years of study; and chose as the subject of his inaugural dissertation, the influence of the eighth pair of nerves in respiration, as demonstrating the function of the diaphragm. The science of anatomy now became De Blainville’s sole pursuit. His remarkable skill as a draughtsman led to his merits being recognised by Cuvier, who employed him as practical anatomist and artist at a salary of 3000 francs a year; and the great zoologist was so impressed by his assistant’s activity, that he intrusted him to the delivery of a part of his course of lectures on zoology at the college. It was De Blainville’s ambition to become professor, and in 1812 he competed with other candidates for the chair of zoology and physiology at the College de France. Having obtained the honourable post, he defended his well-known thesis on "The Natural Affinities of the Ornithorhynchus Paradoxus." A flattering political position, obtained through his influential father-in-law, was offered to De Blainville; but he resisted the allurements of public life for his favourite science. He came to England in 1816, and during a short stay, made diligent use of his opportunities for adding to his zoological knowledge, and carried away drawings of the rare Molusca in the British Museum, and of anatomical specimens in the museum of the Royal College of Surgeons. Some of his papers, published in the "Bulletin de la Société Philoménique," bear testimony to the good use he made of his sojourn in this country. In 1825 De Blainville was elected a member of the Academy of Sciences at Paris. On the retirement of Lamarck in 1830, he was appointed to the chair of the natural history of invertebrated animals. After De Blainville’s death (20th of March) in 1832, his widow was succeeded in the chair, and acknowledged head of one of the most important branches of science. In the same year he was elected a foreign member of the Royal Society, and subsequently of the Geological Society of London, where he also a member of other scientific societies on the continent.

De Blainville availed himself of his new position to communicate what has since been recognised as his great work: "Ostéographie, ou Description Iconographique comparée du Système et du Système des Cinq Classes d’Animaux Vertébrés recouverts et fossiles," etc. Twenty-three parts of this magnificent work had been published, and the author had corrected the twenty-fourth part ("Coniuceria"), when on the arrival of Rossen a railway train in which he had taken a place, he was struck by a whirling current of air. This was the 1st of May 1850. On the previous day he had delivered his usual lecture: "exhibiting," says M. Prévost, "a freshness of ideas, and facility of expression, which bore the marks of clear thought and apprehension. Some threatening symptoms had been experienced by him, but, with a force of character peculiar to him, he had sought to conceal them from all, even from himself." All attempts at remissation proved unavailing, and he died a few minutes after his return from the audience.


The fact that De Blainville’s writings number nearly 200 in the whole, will best give a notion of his activity and devotion to science; they comprise researches in all branches of zoology. His "Ostéographie" and "Manuel de Malacologie," two large and comprehensive works, are the epitome of a life. The former includes extinct as well as living animals, and is of rare importance to paleontologists.

De Blainville had a public funeral in Père-la-Chaise. Prévost, Chevreul, and Milne-Edwards each pronounced a discourse over his grave. A passage from the former presents a concise view of what he accomplished. "It was the great object of his life," says M. Prévost, "to establish in all his works, especially in his "Ostéographie," the doctrine that each sub-group was the link of one great chain, ascending from the most simple of organisms to that which occupies the highest place; in other words, from the sponge to man. But while he endeavored to refer all groups and every variety of animal form to one and only one sub-group, he never embraced the plausible hypothesis that each higher grade had been improved in the course of ages out of a lower one by transmutation; on the contrary, he saw in the whole animal creation one single progressive evolution, and maintained that the changes being neither due to chance nor to the influence of external circumstances, but being all the result of one and the same original conception." (Proceedings of the Royal Society: Ann. des Sc.; Agassiz, Buff.; Billsman, Journal; Geo. Soc. Journal; L’Institut de France.)
large showy red flowers. The calyx is girded from four to six broad scales; the corolla with six petals; the fruit a capsule, divided from three to five nerves. B. quinquenervis, Anulet, B. tripinnatis, Linnaeus, is a native of Brazil, Guayana, and Trinidad. It produces a large yellow berry, which is eaten in the countries where it grows. B. purpureascens is a native of Guyana, and is one of the most valuable medicinal plants of the genus, yielding shrub root, rooting itself in other trees. It yields a colouring matter, employed for dyeing red.

BLANCHARD, LAMAN, was born at Great Yarmouth, Norfolk, May 16, 1805. His father having removed to London, he was settled at St. Olave, Hart Street, Southwark.

He commenced the business of life as a printer in the office. From boyhood he had exhibited a great fondness for poetry, and considerable aptitude in verse making; and his first literary achievement was a series of minstrelsy's, entitled 'The Lyric Offering,' published in 1826. Before this, however, in 1827, he had received the appointment of secretary to the Zoological Society. This office he held till 1831, when he resigned it to become acting editor of the 'New Monthly Magazine.' From this time till his death, his talents were wholly devoted to writing for the periodical press, to which he was one of the most varied and prolific contributors. His contributions consisted of poems, essays, sketches, and brief pointed paragraphs.—It is a fact well known to all who have read his journal with which he was at the time connected: and all of them displayed a lively and genial fancy and a ready wit. Mr. Blanchard edited the 'True Sun' newspaper during the wars of 1812. Constitution was his most important work, besides the 'Count Journal,' and the 'Cousier.' For some time previous to his death he had assisted in conducting the 'Examiner.' His death occurred under very painful circumstances. His wife, to whom he was much attached, became very ill about a year before his decease, and her illness ended in insanity. She rallied for awhile, but relapsed and died, under the prolonged anxiety attending her long illness and its fatal termination, his own health and spirits gave way. Guyana and Martinique were his last resorts of residence, but he was occupied, as before, with his studies. This was the fate of one of the most singular characters of the times, who, while he lived, was never known to change his habits. He was put an end to his life, February 16, 1845. His death excited much sympathy, especially among his literary brethren, by whom he was greatly esteemed. His Essays and Sketches have been collected and published, with a Memoir by Sir E. Bulwer Lytton.

BLEASSINGTON, WickeLOW.

BLEASSINGTON, MARGUERITE, Countess OF, was born at Knockbr, near Crammel, Tipperary county, Ireland, on the 21st of September, 1799, and was the third daughter of Mr. Edmund Power, of Cragg, county Tipperary, Ireland. She was married, in 1827, to a captain farmer, but the marriage was a unhappy one, and Mrs. farmer after a time. He was killed by a fall, and was put an end to his life, February 16, 1845. His death excited much sympathy, especially among his literary brethren, by whom he was greatly esteemed. His Essays and Sketches have been collected and published, with a Memoir by Sir E. Bulwer Lytton.

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part he held his important post, was much canvassed. But
before his watchful supervision of the general interests of
the Church, Bishop Blomfield was a careful overseer of the
duty of his diocese, and prompt to support any proposition
which appeared likely to improve the condition of the
looming classes in the metropolis. Nor in the briefest
notes of Bishop Blomfield ought the amazing success of his
efforts for increasing the number of churches to pass
unnoticed. While Bishop of Chester he zealously set
about building churches in the county, and one of his
most recent public acts was to make an earnest appeal,
secured by a large subscription, to the affluent and liberal
endowments by a vigorous effort to raise funds sufficient, if
possible, to construct as many additional churches as the
Census Report of the Registrar-General shows are still needed
to meet the wants of the vast and rapidly increasing popula-
tion of the metropolis.

The theological writings of Bishop Blomfield consisted of
"The Church Universal of the Apostles," and of numerous
Sermons and Charges.

Bishop Blomfield in 1856 resigned his bishopric, and was
successed by Dr. Tait. He died August 5, 1857, at Fulham,
noted for his liberal views in Church questions.

BLOODSTONE, also called Heliotrope, is a deep green-
stone—a jasper variety of quartz. It has obtained its name
from being spotted with red so as to resemble drops of blood.
In addition to silk, it contains oxides of iron and clay, which
arise from the oxidation of the silicate of iron. It is also
formed in the royal collection at Paris there is a bust of
Christ in this stone, so managed that the red spots repre-
sent drops of blood, (Dana, Mineralogy.)

BLOOD-VESSELS. The blood from which the tissues of
the body obtain the material of their nourishment is conveyed
from one part of the body to another by means of branch-
ated vessels which are named Blood-Vessels. It is carried along
these vessels by the impulse given by the action of the Heart.

[Space]

The vessels which carry the blood from the heart are called
Arteries, and those which carry the blood to the heart are named
Veins. (Voss.) Whilst a very generally diffused net-work of Blood-Vessels exist, connect-
ing the arteries and veins, which are called Capillaries.

[Space]

The Blood-Vessels, whatever may be their ultimate desti-
nation, seem to originate in the same manner. Observations
on this subject have been made by Schwann and Köllicher
in Germany, and by Professor Paget in this country. The obser-
vations of General Duhum were made on the circulation in
the vessels in the germinial membrane of the egg, and on the
capillary blood-vessels of the tail of the larva of a frog. Mr.
Paget's observations were made on the tissues of the foot-sheep.
According to these observations, it appears that the vessels
originate from nucleated cells, similar to those at first
constitute the different parts of the embryo. The cell-wall
external envelope of these cells shots out into slender
pointed processes, such as is seen in the forms of stellate
vegetable tissue. The projections from neighbouring cells
encounter each other, and becoming organically united, the
interwoven walls between the two projections are absorbed,
and thus a continuous tube is produced. In cases where new
vessels are produced in the neighbourhood of old ones, the
stages of the process are repeated, and a new vessel is born in
the old capillary vessels, which unite with the new, and
thus the circulation is re-established. The projections
which first united are solid and very slender, but event-
ually the intervening substance disappears and the vessels
attain a uniform caliber. In growing parts where the web of
vessels is kept up, new ones are constantly being added by
the development of stellate cells in the interstices of the
previous web. Whilst the capillaries early attain the develop-
manship of the arteries and veins, the smaller capil-
laries or veins on either side of the capillary vessels go on
increasing in size till they acquire the special membranes or
walls which distinguish these parts of the circulating system.

This distribution seems however only applicable to the smaller
vessels, and those vessels supplying the more delicate organs
are formed in a different manner, and it is there remarkable to
show that the larger Blood-Vessels may take their
shape in the same manner as the heart, in which organ there
is a sort of englomation of cells, the interior ones of which
become soft, and at last disappear, while the outside ones
become firmer and constitute the outer walls. On this
subject further observations are wanting.

(Sharpey, Quain's Elements of Anatomy; Schwann, Micro-
scopical Researches into the Structure and Growth of Animals and Plants, translated by H. Smith;
Kölliker, Handbuch der Gewebekunde der Menschen: Paget, Supplement to Müller's Physiology, by Bailey and
Kirkc.)

BOERHAEVA, a genus of plants belonging to the natural
order Orlicaeae. The species were formerly comprehended
under the genus Orlicus. One of the species B. nivea, for-
merly Orlicus niveus, is the Rhesus of Assam, and yields fibres
of remarkable fineness and tenacity. It appears from the
reinvestigations which these additional observations have
made that the celebrated grass-cloth of China is identical with the Assam
plant. Several specimens of these fibres manufactured into
light articles of dress were exhibited in the Indian collec-
tion at the Great Exhibition of 1851. The B. niveus is a
herbaceous plant, with broad ovate leaves, which are
downy and white beneath, hence its specific name. It
bears no sting.

BOERHAAVIA, a genus of plants named after the cele-
britate Boerhaave, father of the natural order Nymphaeaceae.

The species of Boerhaavia have generally emetic and pur-
gative properties, and have been employed medicinally both
by the natives of Peru and the East Indies, where the species
are now cultivated. B. tuberosa is stated by Lindley to be the Yerba
de la Purgacion of Peru, and that it is a useful vegetable.

The root of B. documbens is called Hog-Meat in
Jamaicas, and on account of its emetic properties it is some-
times called ipecacuanha in Gyanas. Sir Robert Schom-
berg has stated that it is aromatic, and is useful in dysentery. B.
documbens and B. hirsuta are also said to possess medicinal
properties. (Lindley, Vegetable Kingdom.)

BOG-IRON-ORE, a loose earthy ore of iron, consisting of
Poraide of iron and water. It is of a brownish-black
colour, and occurs in loose boggy masses.

BOOMARUS, a genus of fishes, to which the Vaagmeer,
or Deal-Fish, is referred by Schneider under the specific title
of B. Islandicus. (Trachypterus, S. 2.)

BOLODA, a genus of plants belonging to the natural order Monimiaceae. B. frangula is the Holu of Chili. It
produces an aromatic succulent fruit, which is eaten by the
natives. The wood is very fragrant, and makes a charcoal
which is preferred by the smiths of Chili to that from any
other wood. The leaves are also very fragrant. The bark is
employed in tanning.

BOISIOANDE, JEAN-FRANCOIS, was born in Paris,
August 19, 1774. Towards the end of the year 1799
Boisianne entered into the public service under the ministry
of the Interior, and was appointed Professor in the Ecole
Normal in 1795, but was restored in 1801 by Lucien Bonapar-
tre, who was then minister of the interior, and who made him
secretary-general of the professor of the Experimental
of the Haile-Marine.

Boisianne's works were published in 1802. From then Boisianne
became also a member of the Boisianne Academy and
attended also; and thenceforward devoted himself to literature,
which had indeed previously occupied nearly all his leisure
hours. He had by the year 1802 contributed numerous
articles to the periodicals of the day. In 1809 he was
appointed professor of the Greek language and literature in
the Académie de Paris, but assumed only the title of
assistant-professor, resigning the title of professor to Larcher,
who retained it till his death in 1812. Boisianne then
continued the career, and also applied his place in the Académie des
Sciences in 1809. In 1825 he was made Professor of Greek
in the College de France. Other situations of honour and emol-
ment were afterwards offered to him, but he declined to
accept any of them.

M. Boisianne occupied a considerable portion of his time
in the critical examination of Greek writers previously
meditated, and published a very large number of works and
fragments of works by Philostratus, Ptolemy, Tiberius the
Aethiopician, Herodianus, Eunapius, Aristaeus, and
several others.

In the period from 1823 to 1835 Boisianne published in
24 vols. 32mo, a 'Syloge Poetarum Graecorum,' and in con-
sequence the dictionary in 1835, in a separate copy on Mount
paper and with many corrections. By this time he had
number of the lost Fables of Babrius. Boisianne published
'Babriu Fabliae Iambicae,' Svo, Paris, 1844. (Babrius.)

Boisianne contributed to the edition of 'Athenaeus' by
Ornithology of America, or the ornithology of the United States and Europe. The Prince was always the zealous friend and patron of the votaries of science, and for many years he was the chief promoter of the annual congresses of the scientific men of Italy. He died July 30, 1857, in Paris.

Prince Charles of Napoléon married Brussels, June 30th, 1892, Zenaïde-Charlotte, daughter of his uncle Joseph Bonaparte, by whom he had ten children, of whom three sons and five daughters are living.

BONE-BEDS. Accumulations of the bones of extinct animals, more especially of fish and Saurian reptiles, are not uncommon in various strata, and have had this name given them by geologists. They generally occur at the termination of one formation and the commencement of another. These Bone-Beds are local, and are not in any case very extensive. The thickest and most widely-distributed is that of the Lias, which seems to mark the commencement of the New Red-Sandstone epoch. The most remarkable Bone-Beds are the following:

Bone-Bed at the base of the Lower Greensand at its junction with the Wealden; at the base of the Inferior Oolite, at its junction with the Lias; at the base of the Lias, at its junction with the Red-Marl; at the base of the Belle Tout Limestone, at its junction with the Old Red-Sandstone; at the base of the Old Red-Sandstone, at its junction with the Ludlow Rock of the Shropshire System. (Brodie, On the Basement-Beds of the Inferior Oolite: Pp. 89.)

BONGARDIA, a genus of plants belonging to the natural order Barleridae, or Barleraceae. (Barleridae.)

BONHILL, a town in the parish of Bonhill and district of Lanark or Lennox, Dumfriesshire, Scotland. The parish is divided in its length into almost equal parts by the south.
of Leech Loomond, and the river formed by it, the Leven, from which the district derives its name, and which falls into the Clyde at Dumbarton. The population of the town of Dumbarton hill in 1831, was 6,000.

The town is situated on both banks of the Leven, about five miles above Dumbarton. A mile nearer this town, and on the bank of the stream, is the thriving village of Alexandria, with a population of 3,781.

It is remarkable for its elegant scenery, and for the great extent of its walks and bleached pastures on the banks of the Leven, the water of which, from its softness and purity, is particularly fitted for the processes of printing and bleaching. Coals, lime, and other articles required in manufactures are brought up the river in boat, and the extensive works on the river are generally the property of mercantile houses in Glasgow. The Leven is celebrated for its fine salmon and trout.

Beside the parish church of Benhill there is a chapel-of-ease at Alexandria. At both places are chapels for Free Church and United Presbyterian Dissenters. There are also two chapels in Alexandria for Independents.

BONITO, the name of fishes belonging to the family Scomberidae. The best of them is the Bonito, or Tunny, found in the Atlantic Ocean, and in the Mediterranean Sea. It is perfectly adapted to its element. The extensive works on the river are generally the property of mercantile houses in Glasgow. The Leven is celebrated for its fine salmon and trout.

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Placentas central  
Leaves opposite  
Rhizophoraceae. 
Leaves alternate  
Leguminosae. 
Stipules on the side  
Himaliaceae. 

b. Stipules absent 

1. Carpels more or less distinct. 
Anonaceae. 

2. Carpels united  
Stamens spread about  
Nympheaceae. 
Placentas on sides  
Losaeae. 
Petals definite, distinct  
Costaeae. 
Petals indefinite, confused  
Placentas in the centre 
Leaves dotted 
Ovary 1-celled  
Chamaelucriaceae. 
Ovary more than 1-celled  
Myristaceae. 
Petals dotless  
Mesembryaceae. 
Petals few  
Alangiaceae. 
Petals narrow  
Alangiaceae. 
Petals round  
Alangiaceae. 

3. Stamens hypogynous 
Stamens perigynous  
Leguminosae. 
Carpel solitary  
Leguminosae. 
Carpels 00  
Magnoliaceae. 
Stamens solitary  
Leguminosae. 
Stamens perigynous  
Leguminosae. 

4. Stylos coming from apex of carpels  
Carpel 1  
Dryopeaceae. 
Carpels more than 1  
Rosaceae. 
Stylos coming from base  
Chrysobalanaceae. 

5. Carpels united; placentas more than 1  
Placentas on the side (parietal) 
Leaves dotted, dots round  
Flacourtiaceae. 
Leaves dotted, dots linear and round, mixed  
Smydaceae. 

6. Placentas in the centre  
Calyx imbricated  
Flowers unisexual. 
Euphorbiaceae. 
Flowers hermaphrodite  
Ovary 1-celled; sepals 2  
Portulacaceae. 
Ovary 2 or more celled  
Portulacaceae. 
Calyx double  
Chlamaceae. 
Calyx single  
Cistaceae. 
Calyx valvate  
Stamens monadelphous; 
andthers 2-celled  
Stamens columnar  
Sterculiaceae. 
Stamens non-columnar  
Byttneraceae. 
Stamens monadelphous; 
andthers 1-celled  
Malvaceae. 
Stamens monadelphous; 
calyx irregular  
Dipteraceae. 
Stamens distinct  
Tiliaceae. 

5. Stipules absent 

1. Carpels more or less distinct or solitary  
Carpels immersed in a disk  
Nelumbiaceae. 
Carpels not immersed  
Stamens hypogynous 
Stamens perigynous  
Embryo in a vitellus  
Colombaceae. 
Embryo naked, very minute  
Dilleniaceae. 
Seeds with an aril; 
Exarillate; albumen fleshly  
Flowers hermaphrodite  
Ranunculaceae. 
Flowers unisexual  
Schizandraceae. 
Exarillate; albumen ren- 
minated; 
Embryo nearly as long as seed  
Anonaceae. 
Calyx much imbricated  
Fruit a legume  
Leguminosae. 
Fruit not a legume  
Hypericaceae. 
Seeds smooth  
Resaeaeae. 
Seeds hairy  
Resaeaeae. 
Calyx little imbricated  
Anacardiaceae. 
Fruit not a legume  
Anacardiaceae. 
Fruit a legume  
Anacardiaceae. 

2. Carpels united; placentas more than 1  
Placentas parietal, in lines  
Anther versatile; juice watery  
Papaveraceae. 
Anther innate; juice milky  
Papaveraceae. 
Placentas parietal, spread over  
Placourtiaceae. 
the lining of the fruit  
Placours spread over dissepiments  
Nympheaceae. 
Filaments united  
Stigma broad and petaloid  
Sarraceniaceae. 
Stigma simple  
Ovary 1-celled  
Portulacaceae. 
Ovary many-celled  
Calyx much imbricated  
Leaves compound  
Rhizophoraceae. 
Leaves simple  
Petals equal to sepals  
Clusiaceae. 
Seeds few  
Marantaceae. 
Petals numerous; 
seeds flat  
Vitaceae. 
Petals numerous; 
petals crumpled  
Vitaceae. 
Calyx little or not at all imbricated 
Stamens perigynous; 
calyx tubular  
Lythraceae. 
Stamens hypogynous; 
calyx many- 
leaved  
Humiriaceae. 

6. Stipules absent 

1. Carpels parietal  
Flowers unisexual  
Cucurbitaceae. 
Flowers hermaphrodite  
Meliaceae. 
Placentas in the centre 
Flowers in umbels; styles 2  
Meliaceae. 
Flowers in umbels; styles 3  
Meliaceae. 
Flowers not in umbels  
Carpels solitary  
Petals strap-shaped; stam- 
men distinct  
Alangiaceae. 
Petals very narrow; stamens 
growing on them  
Loranthaceae. 
Petals oblong; leaves hispid 
Cotyledons convolute  
Combraccaceae. 
Cotyledons flat  
Haloragaceae. 
Petals oblong; leaves balsamic  
Anacardiaceae. 
Carpels divaricating 
Leaves alternate: herbs  
Saxifragaceae. 
Leaves opposite; shrubs 
Hydrophyllaceae. 
Carpels parallel, combined  
Calyx valvate; petals oppo- 
site stamens  
Rhamnaceae. 
Calyx valvate; petals alter- 
ate with stamens  
Rhamnaceae. 
Albmnun none  
Onagraceae. 
Albmnun copious  
Coraceae. 
Calyx not valvate  
Stamens doubled  
Melastomaceae. 
Calyx curved  
Leaves dotted  
Myrtaceae. 
Leaves not dotted  
Parts of flower  
Parts of flower not  
Ovules ascending  
Onagraceae. 
Ovules pendulous  
Haloragaceae. 
Parts of flower not  
definite; seeds many 
Leafy  
Eeolomoneae. 
Scaly  
Monopetaloaeae. 
Parts of flower not  
finely  
Bromeliaceae. 

B. vary wholly superior 

a. Leaves stipulate
1. Carpels distinct or solitary
   Anthers with recurved valves.  
   Anthers with longitudinal valves
   Style from the base of the carpel.
   Style from apex of carpel; fruit a legume.
   Style from apex of carpel; fruit a drupe or capsule.

2. Carpels wholly combined:
   Placentas parietal
   Flowers with appendages.
   Flowers without appendages.
   Leaves with round and oblong transparent dots.
   Leaves dotted, circinate when young.
   Leaves dotted, straight when young; fruit calyptrate.
   Leaves dotted, straight when young; fruit silique.

Placentas central
   Style distinct
   Calyx in a broken whorl.
   Calyx in a complete whorl.
   Flowers unisexual.
   Flowers hermaphrodite.
   Petals minute.
   Petals large; stamens hypogynous.
   Petals large; stamens perigynous; leaves opposite.
   Petals large; stamens perigynous; leaves alternate.
   Calyx valvate
   Styles more or less combined, gynobasic
   Gynobase fleshy.
   Gynobase dry; leaves opposite.
   Gynobase dry; leaves alternate.
   Fruit beaked.
   Fruit not beaked.

Placentas covering dissepiments
   Styles distinct
   Calyx valvate.
   Calyx in a broken whorl.
   Flowers spurred.
   Flowers not spurred; calycule.
   Flowers not spurred; naked.
   Calyx in a complete whorl.
   Leaves compound; sepals more than 2.
   Leaves simple; sepals about 2.
   Leaves simple; sepals 2.
   Calyx valvate or open.
   Stamens columnar.
   Stamens not columnar.
   Stamens opposite petals.
   Perigynous.
   Hypogynous.
   Stamens alternate with petals.
   Spathilaces.
   Malpighiaceae.
   Portulacaceae.
   Sterculiaceae.

3. Carpels divided into a solid pistil
   Placentas parietal
   Stamens tetradynamous.
   Stamens not tetradynamous.
   Flowers with sterile stamens.
   Flowers with sterile stamens.
   Stamens and pistils on distinct flowers.
   Petal-flower crowned.
   Pistil-flower not crowned.
   Stamens and pistils together; placentae lining the fruit.
   Stamens and pistils together; placentae in rows.
   Flowers without sterile stamens.
   Disk of flower large; stamens indefinite.
   Disk of flower large; stamens definite.
   Disk of flower small or none.
   Alburnum large.
   Alburnum small.
   Calyx 5-leaved.
   Calyx tubular.

Placentas central
   Styles distinct
   Calyx valvate.
   Calyx in a broken whorl.
   Flowers spurred.
   Seeds hairy.
   Seeds smooth; stamens polyadephous.
   Seeds smooth; stamens monadephous, or free.
   Calyx in a complete whorl.
   Stamens arising from scales.
   Stamens not arising from scales.
   Styles combined; flowers hermaphrodite.
   Styles combined; flowers unisexual.
   Styles divided; flowers irregular.
   Styles united, not gynobasic
   Calyx in a broken whorl.
   Flowers unisemetric.
   Flowers unisemetric.
   Flowers regular.
   Petals without appendages.
   Petals with appendages.

---

1. Fruit a legume; radicle next hilum.

---

2. Fruit a legume; radicle away.
   Conmonaaceae.

---

3. Fruit not leguminous
   Carpels with 1 scale.
   Carpels with 2 scales.
   Carpels without scales.
   Alburnum abundant; embryo minute.
   Flowers unisexual.
   Flowers hermaphrodite.
   Embryo in vitellus.
   Embryo naked.
   Alburnum solid.
   Alburnum umbonate.
   Alburnum small or none.
   Carpels several.
   Carpels solitary.
   Leaves dotted.
   Leaves not.
   Moringaceae.

---

4. Carpels divided into a solid pistil.
   Placentas parietal.
   Stamens tetracydynamous.
   Stamens not tetracydynamous.
   Flowers with sterile stamens.
   Flowers with sterile stamens.
   Stamens and pistils on distinct flowers.
   Petal-flower crowned.
   Pistil-flower not crowned.
   Stamens and pistils together; placentae lining the fruit.
   Stamens and pistils together; placentae in rows.
   Flowers without sterile stamens.
   Disk of flower large; stamens indefinite.
   Disk of flower large; stamens definite.
   Disk of flower small or none.
   Alburnum large.
   Alburnum small.
   Calyx 5-leaved.
   Calyx tubular.

---

5. Flowers with sterile stamens.
   Stamens and pistils on distinct flowers.
   Petal-flower crowned.
   Pistil-flower not crowned.
   Stamens and pistils together; placentae lining the fruit.
   Stamens and pistils together; placentae in rows.
<table>
<thead>
<tr>
<th>Sub-Class, Monotropaeae.</th>
<th>(Petals united into a Tube.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Flowers regular</td>
<td></td>
</tr>
<tr>
<td>a. 2-4-5-lobed</td>
<td></td>
</tr>
<tr>
<td>Leaves dotted</td>
<td>Rutaceae.</td>
</tr>
<tr>
<td>Leaves scale</td>
<td></td>
</tr>
<tr>
<td>Inflorescence gyrate</td>
<td>Boraginaceae.</td>
</tr>
<tr>
<td>Inflorescence straight</td>
<td></td>
</tr>
<tr>
<td>Corolla petalate in motivation</td>
<td>Nolinaceae.</td>
</tr>
<tr>
<td>Corolla flat in motivation</td>
<td>Stachysonaceae.</td>
</tr>
<tr>
<td>b. Ovary not lobed</td>
<td></td>
</tr>
<tr>
<td>Carpels 4 or 5, or none</td>
<td></td>
</tr>
<tr>
<td>Anthers porous</td>
<td></td>
</tr>
<tr>
<td>Seeds winged</td>
<td>Pyrolaceae.</td>
</tr>
<tr>
<td>Seeds wingless</td>
<td></td>
</tr>
<tr>
<td>Anthers biciporous</td>
<td>Ericaceae.</td>
</tr>
<tr>
<td>Anthers uniporous</td>
<td></td>
</tr>
<tr>
<td>Anthers slit</td>
<td></td>
</tr>
<tr>
<td>Stamens opposite petals</td>
<td>Myrtrinaceae.</td>
</tr>
<tr>
<td>Shrubs</td>
<td></td>
</tr>
<tr>
<td>Leaves opposed</td>
<td>Primulaceae.</td>
</tr>
<tr>
<td>Stamens not opposite petals</td>
<td></td>
</tr>
<tr>
<td>Seeds numerous</td>
<td></td>
</tr>
<tr>
<td>Carpels distinct</td>
<td>Crassulaceae.</td>
</tr>
<tr>
<td>Car, or, striped</td>
<td>Monotropaceae.</td>
</tr>
<tr>
<td>Seeds few</td>
<td></td>
</tr>
<tr>
<td>Carpels distinct</td>
<td></td>
</tr>
<tr>
<td>Ovules erect</td>
<td></td>
</tr>
<tr>
<td>B. Flowers irregular</td>
<td></td>
</tr>
<tr>
<td>a. Ovary 4-lobed</td>
<td>Lamiaeae. (Lw. biotre).</td>
</tr>
<tr>
<td>b. Ovary undivided</td>
<td>Selaginaceae.</td>
</tr>
<tr>
<td>Carpels 2</td>
<td></td>
</tr>
<tr>
<td>Fruits capsule or succulent</td>
<td></td>
</tr>
<tr>
<td>Placentas parietal</td>
<td></td>
</tr>
<tr>
<td>Seeds amygdaloid</td>
<td></td>
</tr>
<tr>
<td>Fruit succulent, many-seeded</td>
<td>Crassulaceae.</td>
</tr>
<tr>
<td>Fruit bony, few-seeded</td>
<td>Pedaliaceae.</td>
</tr>
<tr>
<td>Seeds not amygdaloid</td>
<td></td>
</tr>
<tr>
<td>Leafy</td>
<td></td>
</tr>
<tr>
<td>Seeds winged</td>
<td>Bignoniaceae.</td>
</tr>
<tr>
<td>Seeds wingless</td>
<td>Genusaceae.</td>
</tr>
<tr>
<td>Scaly</td>
<td>Orobanchaceae.</td>
</tr>
<tr>
<td>Placentas in centre</td>
<td></td>
</tr>
<tr>
<td>Albumen large</td>
<td>Serophyllaceae.</td>
</tr>
<tr>
<td>Albumen none</td>
<td></td>
</tr>
<tr>
<td>Seeds winged</td>
<td>Bignoniaceae.</td>
</tr>
<tr>
<td>Seeds wingless</td>
<td>Acanthaceae.</td>
</tr>
<tr>
<td>Placentas free, central</td>
<td>Leucebolaraceae.</td>
</tr>
<tr>
<td>Fruit nucamentaceous, 2-celled</td>
<td>Selaginaceae.</td>
</tr>
<tr>
<td>Anthers 1-celled</td>
<td>Stilbacce.</td>
</tr>
<tr>
<td>Anthers 2-celled</td>
<td></td>
</tr>
<tr>
<td>Fruit nucamentaceous, 4-celled</td>
<td></td>
</tr>
<tr>
<td>Radicle inferior</td>
<td>Verbenaceae.</td>
</tr>
<tr>
<td>Radicle superior</td>
<td>Myoporaceae.</td>
</tr>
</tbody>
</table>

| 11. Ovary inferior.        |                                 |
| A. Carpels single           |                                 |
| Anthers united             |                                 |
| 
|---|
| **BOT** |
| **CALMAR** |
| **OVULES PENDULOUS** | **Calyceraceae.** |
| **OVULES ERECT** | **Composite.** |
| **ANTHERS FREE** | **Aristolochiacae.** |
| **CARPELS 1** | **Dipsacaceae.** |
| **CARPELS 3, 2 abortive** | **Valerianaceae.** |
| **ANTHERS UNITED** | **Lobeliaceae.** |
| **ANTHERS FREE** | **Oleaceae.** |
| **STAMENS 2** | **Osmuthiaceae.** |
| **STAMENS more than 2** | **Papaveraceae.** |
| **ANTHERS porous** | **Platanaceae.** |
| **ANTHERS slit** | **Rutaceae.** |
| **STIGMA naked** | **Fagaceae.** |
| **STAMENS 4, 5** | **Gummiaciae.** |
| **STAMENS numerous** | **Labiatae.** |
| **ANTHERS and stigmas united** | **Myricaceae.** |
| **STIGMA indistinct** | **Myricaceae.** |
| **STIGMA simple** | **Myricaceae.** |
| **STIGMAS** | **Myricaceae.** |
| **Without stipules** | **Myricaceae.** |
| **Leaves opposite** | **Myricaceae.** |
| **STEM square** | **Myricaceae.** |
| **STEM round** | **Myricaceae.** |
| **SUB-CLASS, APETALAE, OR INCOMPLETE.** | **Myricaceae.** |
| **(Without petals, sometimes without calyx.)** |
| **I. Without a Calyx (Achlamydeae).** |
| **A. Stipules present** |
| **OVULES numerous** | **Bolbitiaceae.** |
| **Seeds winged** | **Salicaceae.** |
| **Seeds comose** | **Salicaceae.** |
| **OVULES solitary or few** | **Salicaceae.** |
| **Flowers with stamens and pistils** | **Chloranthaceae.** |
| **Stamens unisexual** | **Cunoniacae.** |
| **Stamens whorled** | **Cunoniacae.** |
| **Flowers unisexual** | **Cunoniacae.** |
| **Carpel unisexual; ovules erect** | **Myricaceae.** |
| **Carpel solitary; ovules pendulous** | **Myricaceae.** |
| **Carpels trilocular** | **Myricaceae.** |
| **B. Stipules absent** |
| **OVULES very numerous** | **Podostemaceae.** |
| **OVULES single or few** | **Podostemaceae.** |
| **Flowers hermaphrodite** | **Podostemaceae.** |
| **Embro in vitellus** | **Podostemaceae.** |
| **Embro without vitellus** | **Podostemaceae.** |
| **Flowers unisexual** | **Podostemaceae.** |
| **Flowers nated; carpel simple** | **Myricaceae.** |
| **Flowers nated; carpel double** | **Myricaceae.** |
| **Flowers covered; anther-valves recurved** | **Myricaceae.** |
| **Flowers covered; anther-valves slit** | **Myricaceae.** |
| **II. CALYX present (Monochlamydeae).** |
| **A. CALYX inferior** |
| **a. Stipules present** |
| **Flowers with stamens and pistils** | **Aristolochiacae.** |
| **Flowers unisexual; fruit in a cup** | **Corylaceae.** |
| **Flowers unisexual; fruit naked** | **Bignoniaceae.** |
| **Many-seeded** | **Aristolochiacae.** |
| **1-seeded** | **Aristolochiacae.** |
| **b. Stipules absent** |
| **Flowers unisexual, in catkins** | **Myricaceae.** |
| **Leaves simple, alternate** | **Myricaceae.** |
| **Leaves simple, opposite** | **Myricaceae.** |
| **Leaves compound** | **Myricaceae.** |
| **Flowers unisexual, not in catkins** | **Myricaceae.** |
| **Seeds in a pulp** | **Myricaceae.** |
| **Seeds dry** | **Myricaceae.** |
| **Numerous** | **Myricaceae.** |
| **Solitary** | **Myricaceae.** |
| **Flowers hermaphrodite** | **Myrtaceae.** |
| **Leaves dotted** | **Myrtaceae.** |
| **Leaves not dotted** | **Myrtaceae.** |
| **OVARY 3-6-celled** | **Myrtaceae.** |
| **OVARY 1-celled** | **Myrtaceae.** |
| **EMBRYO straight; cotyledons convoluted** | **Myrtaceae.** |
| **EMBRYO straight; cotyledons flat** | **Myrtaceae.** |
| **ALBUMEN absent** | **Myrtaceae.** |
| **ALBUMEN fleshy** | **Myrtaceae.** |

**Flowers unisexual**

| **Carpels several, united** |
| **OVULES numerous** | **Nepenthaceae.** |
| **OVULES few** | **Xanthorrhoeaceae.** |
| **Leaves alternate** | **Euphorbiaceae.** |
| **Ovule smooth** | **Euphorbiaceae.** |
| **Flowers in involucres** | **Euphorbiaceae.** |
| **Flowers naked** | **Euphorbiaceae.** |
| **Carpel solitary** | **Euphorbiaceae.** |
| **CALYX open** | **Euphorbiaceae.** |
| **Carpel several** | **Euphorbiaceae.** |
| **Carpel solitary** | **Euphorbiaceae.** |
Flowers not gynandrous
Veins of leaves diverging from the midrib

Anther 1, with 1 cell

Anther 1, with 3 cells

Anthers 3 or 6

Bicicia
Trilliaem
Juncaginaceae

Pietiaceae

Iridaceae

Cycadaceae

BOT stator

Smilacea

Cytinaceae

Nautilaceae

Marantaceae

Zingibertuta

Bud, Burmanniaceae

Roxburghiaceae

monadelphous

ovules

albumen

seed

Zingiberaceae

Burmanniaceae

Iridaceae

Cycadaceae

BOT

sta-

to

Smilacea....

Cytinacar.

NaUulacect.

MarantacM.

ovules

albumen

seed

Zingibertuta.

Bud, Burmanniaceae

Roxburghiaceae

monadelphous

ovules

albumen

seed

Zingibertuta.

Bud, Burmanniaceae

Roxburghiaceae

monadelphous

ovules

albumen

seed

Zingibertuta.

Bud, Burmanniaceae

Roxburghiaceae

monadelphous

ovules

albumen

seed

Zingibertuta.

Bud, Burmanniaceae

Roxburghiaceae

monadelphous

ovules

albumen

seed

Zingibertuta.

Bud, Burmanniaceae

Roxburghiaceae

monadelphous

ovules

albumen

seed

Zingibertuta.

Bud, Burmanniaceae

Roxburghiaceae

monadelphous

ovules

albumen

seed

Zingibertuta.

Bud, Burmanniaceae

Roxburghiaceae

monadelphous

ovules

albumen

seed

Zingibertuta.

Bud, Burmanniaceae

Roxburghiaceae

monadelphous

ovules

albumen

seed

Zingibertuta.
**BOTANUS**

**BOU**

<table>
<thead>
<tr>
<th>Spore-case with valves</th>
<th><em>Jungermannia</em></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Spore-case valveless</td>
<td><em>Marchantia</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A distinct axis of growth</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spores with elaters</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spore-case with valves</td>
<td><em>Jungermannia</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spore-case in cones</td>
<td><em>Liquidambar</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spores without elaters</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spore-case on fronds</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ringed</td>
<td><em>Polypodiaceae</em></td>
<td><em>Dennstaedtiaceae</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not ringed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spore-case on edge of frond</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spore-case in an incinera</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marsileaceae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spore-case naked</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senile in the axil of frond</td>
<td><em>Lycopodiaceae</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stalked</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valves</td>
<td><em>Andreaeae</em></td>
<td><em>Lycopodiaceae</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without valves</td>
<td><em>Bryaceae</em></td>
<td><em>Lycopodiaceae</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**II. Without Stems.**

**Hyphum present**

Spores in fours

**Hymenium naked**

*Agaricaceae* | *Fungi* | *Lycopsidaeaceae* |

**Hymenium inclosed**

*Ascomycetaceae* | *Ascomycetaceae* | *Lycopsidaeaceae* |

**Sporo-case single**

Thallus obsolete | *Uredinaceae* | *Botrytaceae* |

Thallus floccose | *Uredinaceae* | *Botrytaceae* |

Sporo-case inclosed | *Helvocellaceae* | *Mucoraceae* |

In saci | | |

In a veil | | |

**Hyphum absent**

**Agaricaceae**

**Crystalline** | *Dictioseae* |

**Cellular or membranous**

**Fresh-water chiefly**

*Conioceae* | *Characeae* |

**Multiplied by zoospores**

**Multiplied by spiral nuclei**

**Salt water**

*Fulaceae* | *Ceratocellaceae* |

**Multiplied by simple spores**

**Multiplied by tetrapores**

**Terrestrial**

**Sporo-case naked**

**Sporo-case in saci**

Thallus gelatinous | *Collemaeaceae* |

Thallus polvulent | *Pometaceae* |

**It will be seen that many of the orders are repeated in its analysis under different divisions; and this arises from the fact that this analysis is artificial, and only expresses the partial characters of each order. Besides this, in the strongest orders, exceptions to some very general points of structure frequently occur. Thus we have apothecia and irregular-flowered plants in the polypetalea regular-flowered order *Bordeauxia.* With a little practice such an analysis as the following will enable any one acquainted with the structure of plants to refer any particular plant to its right order, and turning to the order in the alphabetical part of this work will find a detailed account of its structure and properties.**

**NOTABURS. [Britten.]**

**BOTTLE-GOURD. [LAONARIA, S. J.]**

**BOULDERs.** Of the materials of which superficial deposits of the debris of ancient rocks are composed, some are of large size, and have been called Boulders or Erratic Blocks. The portions of smaller size are called Gravel. Boulders are generally found not far from the rocks from which they have been broken, whilst gravel is carried to a great distance. Instances, however, are not wanting in which boulders have been transported an immense distance. They have been transported from Norway and Sweden to the plains of Germany, and from the mountains of Scotland to the centre and south of England. So large have been some of these boulders, and the obstacles such as interesting hills, valleys, and seas so great, that the mode of their transportation can be accounted for in no other way than by supposing that they have been floated across them massed ice, which as they have melted have dropped in the places where they are now found when those places were at the bottom of a sea. The largest boulders seem to have drifted in all cases from northern and southern points towards the warmer districts in the temperate and tropical parts of the earth.

**BOURMONT, LOUIS AUGUSTE VICTOR DE CHAISNE, MARSHAL COUNT DE,** was born at Paris, or, according to other accounts, at the castle of Bonmont, in Anjou, in the year 1773. Having entered the army in 1796, at the age of fourteen, he served as a lieutenant in the Royal French Guards until 1799, when he emigrated, and joined the army of the Prince de Condé. His sanguine disposition and earnest character recommended him so strongly to the emigrant leaders that he was immediately employed in fomenting the insurrection of the western provinces. In October 1798, he was despatched by the Prince to the headquarters of the Viscount de Sépeaux, under whose orders he commanded one of the corps of the Vendean troops, and was promoted to the rank of major-general. At this time he was only in his 21st year.

In December 1793 he was sent to England to endeavour to prevail on the British government to assist the Bourbon cause, but his mission proved abortive. He had the satisfaction, however, of seeing the Count d’Artois, afterwards Charles X, who received him in the most cordial manner, knighted him, and authorised him to confer the same honour on other loyal gentlemen adhering to the monarchical interests, and more particularly on the Viscount de Bourmont. He paid a second visit to England in 1796, exhibiting the greatest zeal in animating the French emigrants against the republic, and in collecting all the elements of civil war. Soon after he returned to France to share the perils of a new insurrection by the Vendean, and, when in the place of the Emigration in 1799, on the 16th of October of the same year he forced his way into Le-Mans, the chief place in the department of Sarthe, committing, it is asserted, great cruelties, pillaging the inhabitants of nearly a million of francs, burning the post-office, the public records, and the library in the Hôtel-de-Ville.

About the period of the 16th Brumaire, when M. de Chaumont and other insurgent leaders found it necessary to submit to the central government, the Marshal Bonmont, who had followed their example. He strove to induce Georges Ca-ndrel to do the same; but that inflexible chief, far from complying, evinced his disgust at the proposal in 1801, by ordering Bourmont’s brother-in-law to be shot. The active mind of the young soldier disposed him to a life of ease; he therefore offered his services to Bonaparte, and appears to have exhibited more eagerness than discretion in so doing. The ever-vigilant Fouché suspected his zeal; he caused the Count to be strictly watched, and, having discovered what he considered as intended, he caused him to be forcibly committed to him a prisoner to the Temple, Paris, in 1803. From this prison he was transferred to the citadel of Dijon, and thence to that of Beauchamp. Having escaped from this last place of confinement, he took refuge in the north of France, and spent some years. The French army having masters of that country in 1810, Bonmont made interest with the victorious general, was included in the capitulation, and returned to France with the army. He now submitted fully to the imperial government of Napoleon, and was offered the brevet of colonel, which he accepted. It must be observed, however, that in the vindication of his career, published in 1840 by his son, it is stated that when the Count made his submission he was at Nantes in France, and that he was allowed his liberty on condition of taking service in the army of Napoleon. His son goes so far as to assert that, in 1800, the First Consul offered him the post of lieutenant-general, which he declined.

From 1810 to 1814, Bonmont continued faithful to his new master; distinguished himself in several battles, especially at that of Nogent; and received no less than ten wounds, four of which were sabre cuts on the head. For this conduct he was rewarded with the rank of brigadier-general in 1813. He was created a lieutenant-general the following year. When the fall of Napoleon tested the character of so many generals and marshals, Bonmont only followed the example of an almost universal defection. He did not betray his chief, Louis XVIII. He did not use his sword on the very eve of his departure from the Tuileries. After the flight of the King, he did not refuse to take service a second time under the powerful man, a single word from whom would have consigned his family to ruin. But he could not brook the despotism manifested in the Acte Additonal, and tendered his resignation to the Emperor in
consequence of it. Receiving no answer, he left the French army on the 15th June, 1816, after fully communicating his design to his successor, General Hulat, to whom he explained every requisite detail of the service. Marshal Gerard, under whom he commanded a division during the campaign, and General Hulat, have, since then, exonerated Count de Bonnefont from all imputations of treachery; whilst Napoleon, in his account of the battle of Waterloo, does not even accuse him.

After his second restoration, Louis XVIII. gave Count de Bonnefont the command of a division, in the infantry of his Guards; and in this rank he served in the campaign of 1817. At that time he was sent for and on the return of the Duke to France, he appointed Bonnefont to the command of the army of occupation. In 1819 the portfolio of the ministry of war was offered to him by Prince Poldnaige; but for some decline in the offer several times, recommended other generals in preference to himself, and was only persuaded to take office by the earnest request of the King. In 1830 the great expedition to Algiers was resolved upon, and the command of an army of 37,000 troops was conferred upon Bonnefont. We have not space to follow his Algerian career. But it must be noted as somewhat remarkable, that the man, who, in a few weeks, obtained for France this large and valuable colony,—the principal conquest she has retained during the present century,—should have been the object of so little public estimation. The reverse of his career added further bitterness to that dislike, and after Bonnefont had been superseded in his command on the 2nd of September, by General Ciaouca, a charge was brought against the deposee leader, related to the manner in which the treasures found in one of the captured towns, one of his sons, had fallen in the campaign, and the custom-house officer at Marsaillle, after the landing of Bonnefont, carried his zeal to such an excess, as to examine the corpse in search for the hidden gold; and the Count has an outrage patiently, but the Countes de Bonnefont received so great a shock, that she never rallied afterwards.

From the year 1830 Marshal de Bonnefont lived in exile; residing at various times in England, Holland, Germany, and other parts of Europe, at length returning to France by Louis Philippe, and in 1840 he took up his abode with his family at the castle of Bourmont. Here he continued to reside in the greatest retirement until the day of his death, which occurred on the 27th of October 1846, at the age of 73. In France Bourmont is, of all the republican and imperial generals upon whom the charge of treason has been affixed, the most unpopular. Neither Moreau nor Pichegru, neither Bernadotte nor Marmon, has been so fully tried and condemned by the public opinion of the country, as Bonnefont. This is only his second in obloquy. After a careful examination of their real conduct, and due allowance being made for the circumstances of the time, it would not require an unusual stretch of charity to remove much of the opprobrium which now attaches to many of those names. But the time to do it effectually is not yet come; and public opinion must be respected even where most it appears to err.

(Description des Contemporains; Alison, History of Europe; Sarrut et Saint Edme, Notices; Fuller, Dictionary Historique.)

BOURNE, HUGH, the founder of the Primitive Methodist Connexion, was born April 3rd, 1772, in the neighbourhood of Stoke-upon-Trent, in Staffordshire. He was brought up in the Wesleyan Methodist communion, and became an active and zealous preacher of that body. His zeal appears to have carried him beyond the bounds allowed by the leaders of the Wesleyan Conference, for when he was about thirty years of age he corresponded with William Clowes and some other preachers of the Wesleyan body in reviving open-air religious services and camp meetings, or great gatherings for preaching and public worship. Thenceforward, in his younger days, he was in the midst of Methodism, and carried to very great lengths in America, were discomfited by the Conference, which in 1807 passed a resolution to the following effect:—

"It is our judgment that even supposing such meetings (camp meetings) to be lowest, they are highly improper in England, and likely to be productive of considerable mischief, and we disclaim all connection with them. This led to Mr. Bourne's separation from the Wesleyan Conference, and the establishment of the Primitive Methodist Connexion, the first class (or local society) of which was formed at Stanley, in Staffordshire, in 1810. This body, which in 1811 had two preachers and about 200 members, has since grown to 332 preachers, and 7842 members. In 1833 the connexion numbered 1789 chapels and 3565 rented rooms, with 566 paid travelling preachers, and 9394 local preachers. The members at the same time had reached 106,965. The discipline of the Primitive or Wesleyan Methodist Connexion includes chiefly in the free admission of laymen to the conference of the former body.
archiepiscopal patronage," in great depression of spirits, Bowles made a tour through the north of England, Scotland, and some parts of the continent; and it was during this tour that he composed the 'Sonnets' which first made him known as a poet. The 'Sonnets' were intended for his own solace, and were not even committed to paper; but in 1789, when he had been some time back in England, it occurred to him, as he was passing through Bath on his way to Oxford, to send them to his friend Mr. Grattwell, and have them printed. Accordingly, he got Mr. Grattwell, printer of a Bath newspaper, to strike off a hundred copies 4to, under the title of 'Fourteen Sonnets,' written chiefly on Picturesque Spots during a Journey. The copies were sent to Bowles, and by the end of the next month after the publication he received a letter from Mr. Grattwell, informing him that the 100 copies were all sold, and that he could have sold 500. Much encouraged (his father was just dead, and his mother was in somewhat reduced circumstances), he printed a second edition of 500, adding some new sonnets; and some time afterwards a third edition of 750 was called for.

It is curious now, looking back, to think that in a year or two, when France was in the throes of revolution, the publication from a provincial press of 'Fourteen Sonnets,' by a young clergyman disappointed in love, should have been an event of any consequence in England; and yet so it was. A new literary spirit, and new notions of poetry, were making their appearance. The sonnet was received, as something fresh and natural, even if but feeble, after the strong and fine artificialities, as they are called, of Dryden, Pope, and their followers. Bowles's sonnets came at the paper moment. Other young men of presenting age, in that year or two, had appeared, and all new vein; but, both as the pupil of the Warton's and by reason of his natural susceptibility, Bowles was fitted to take the lead. His sonnets were read and read again by all academic young men of taste and spirit; and children of his parish, after the first copies, kept out of school, and had to be sent for. Bowles was known, Southey, and Lovell. "I had just entered on my seventeenth year," says Coleridge, when the sonnets of Mr. Bowles, twenty-one in number (this was the second edition), and just then published in a quarto pamphlet, were first made known to him. Coleridge said, "I do not recall good verses published by us [that is, Christ's Hospital] for the University. As my school finances did not permit me to purchase copies, I made, within less than a year and a half, more than forty transcriptions, as the best presents I could offer to those who had the same interest as myself, and with almost equal delight did I receive the three or four following publications of the same author." These "three or four following publications" of Bowles were short copies of verses on occasional subjects. They were published in 1788, 1790, and 1791. Thus in 1789 were published "Verses to John Howard on his 'State of Prisons and Lazarettos,'" and in 1790 verses 'On the grave of Howard.' In these, although not so conspicuously as in the 'Sonnets,' a tender spirit and sensibility is displayed. It is not far less artificial than bad till that time been usual in poems. In short, though the revolution in British poetry had already broken forth in Cowper and Burns, and though it was to be completed in Wordsworth and Coleridge, Bowles's 'Sonnets' and other pieces, published in 1789 and the following years, were perhaps the first conscious inuition of the new principles. Wordsworth and Coleridge soon proclaimed and illustrated them with greater power of genius; but all their efforts were not with that kind of dithyrambic allegiance to Bowles as their titular patriarch.

Hardly foreseeing all this, Bowles left Oxford finally in 1792, having taken his degree, and devoted himself to the duties of his profession. From an humble curey in Wiltshire, he ascended by steps; and at the age of twenty-nine was living in the same county, and afterwards to another in Gloucestershire. In 1787 he married a daughter of the Rev. Dr. Wake, prebendary of Westminster. In 1803 he obtained the living of Great Bedwyn. Specimens of his poetry, which he published in 1806, included the long-awaited patronage of Archbishop Moore at last visited him in the shape of a preferment to the valuable living of Bremhill in Wiltshire. Bowles was then forty-three years of age; but he continued to reside in his picturesque county, and did not die till he was in the remaining forty-five years of his long life, discharging the duties of his parish in such a manner as to win the affection of his parochioners, varying his theological readings and his ecclesiastical business with continued exercises in literature, receiving visits from his friends, and happy in what he considered "the inestimable advantage of the social intercourse of such a family as that of Bowood" (Lord Lansdowne). Subsequent ecclesiastical preferments, which did not interfere with the quiet tenantry of his life at the rectory of Bremhill, were, his appointment in 1818, to be chaplain to the prince regent, and his appointment in 1828 to be canon of Salisbury cathedral.

But Bowles's life was not contented with issuing fresh editions of his 'Sonnets' and early poems (an eighth edition of the 'Sonnets' appeared in 1829), and with adding a few occasional pieces to the collection. In 1804 he published his longest poem, entitled 'The Spirit of Discovery,' in six books of blank verse, and followed it in the next two years with works in 10 vols. in 1807. These two publications, together with his general fame as a writer of sonnets, were the ground for the well-known attack upon him by Byron's 'English Bards and Scotch Reviewers.' Notwithstanding Byron's onslaught, Bowles, like Coleridge and Wordsworth, retained his reputation, and went on republishing old and producing new poems. He and Byron met in a friendly way at Roger's in 1812; and Byron in later life made amends for his satire by speaking of him with respect. Omitting minor productions, the following is a list of Bowles's poetical works subsequent to the 'Spirit of Discovery':—"The Missionary of the Andes," in six books of heroic verse, published in 1815; "the Grave of the Last Saxton, a Legend of the Battle of Flodden," in four books of blank verse, published in 1817; "Bowles," a dramatical didactic poem in blank verse, published in 1829; "St. John in Patmos," a blank verse poem of considerable length, first published anonymously; "On Scenes and Shadows of Days Departed," a series of poems with prose annotations, first published in 1837, in the author's seventieth year; and "The Village Verse-Book," published in the same year, and consisting of simple hymns composed by him for the use of his parishioners. After this, Bowles did not publish much. Nor had any of his poems since "The Missionary," which is considered on the whole the best of his large works, greatly added to his reputation. In all of them were discerned the same free taste, the same sensibility to the finer beauties of natural life, the same pathos, the same poetical faculty, and the same power of cultural expression which had distinguished his first sonnets; but it was felt on the whole that he was a kind of feebler Wordsworth, whose poetry, so long as he chose to write any, was rather to be received with respect and dipped into at leisure than eagerly read and appreciated.

But the whole virtue of Bowles's life did not lie in his poems. He was also a very busy prose-writer. If the list of his prose-writings is extended, it is found that he proved considerable versatility on the part of the author. The "Pope and Bowles Controversy," which lasted from 1819 to 1828, if indeed it may not date from 1807, when Bowles's edition of Pope was published, has a permanent interest in one respect. It is true that neither his "Pope," nor his "Bowles," nor the "Controversy," is of the value of his verse; but it is a complete prose, between the old or eighteenth century school of English poetry and the so-called new or nineteenth century school. Bowles, while doing justice as he thought to Pope's true excellences, had made some reflections on his moral character, tending to depreciate it; and he had, in an appended essay 'On the Poetical Character of Pope,' laid down this proposition, as determining the comparatively inferior rank of certain portions of Pope's poetry. — All images drawn from beauty are more beautiful and sublime than images drawn from art, and are therefore more poetical; and in like manner the passions of the human heart, which belong to nature in general, are per se more adapted to the higher species of poetry than those of the intellect. In 1828, Bowles published "The Principles," &c. which is a work of the right of the world to the artificial to furnish images to poetry, and instanced "ships" and the like to prove how beautiful and poetical such images might be. The work is a complete justification of Bowles's first distinct contradiction to Bowles's critical theory of poetry. Campbell vigorously defended the right of the world of the artificial to furnish images to poetry, and instanced "ships" and the like to prove how beautiful and poetical such images might be. The work is a complete justification of Bowles's first distinct contradiction to Bowles's critical theory of poetry. Campbell vigorously defended the right of the world of the artificial to furnish images to poetry, and instanced "ships" and the like to prove how beautiful and poetical such images might be.
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letters for Pope and Campbell against Bowles, to which also Bowles replied. Other critics, including Octavius Gil- christ and the "Quarterly Review," took up the question on Coleridge's behalf and eventually met them one after an-
other, restating his real views in opposition to what he con-
sidered misrepresentations of them, and supporting these views by reasonings and examinations of the reasonings and
effects of his antagonists. For some time he stood alone; but
by the time the "Black Band" came to his assistance, and maintained that on the whole he had had the
best of the argument. This view is now pretty generally
acquiesced in. Bowles never said anything so absurd as that Poetic
rhetoric broke at his feet; or perhaps some
who have engaged in the contro-
versy; he only laid down some critical canons determining the kind of much of Pope's poetry, as compared with higher kinds, of which fine examples were found, he said, in other poets.

BRAVE, BRAKELINCH, [Devoures],
BRAGANTIA, a genus of plants belonging to the natural order Aristolochiaceae. One of the species, B. somnifera,
is said by Dr. Horsfield to be intensely bitter; and to be used as a medicine.

BRACHIODar, [devoures],

BRAY, Edward WELLAKE, F.S.A., a laborious and accurate topographer, was born in London (in the parish of Lene) Sep., 1772. He was apprenticed to one of the eminent practitioners of the

art of enamelling, but having from an early age been strongly
addicted to literary pursuits, he gradually abandoned that
business as a means of life, and devoted himself, a few years
earlier than his contemporaries, to the more congenial
of professional literature. His acquaintance with Mr. Britton
[Burnet, John, S. 2.] had commenced before the expiration
of his apprenticeship, and he also being desirous of exchanging a
service occupation for the pursuits of literature and the
fine arts, he was introduced to the editor of the London Literary
undertakings of a minor description, until they united in
projecting and in producing the well-known work on which their reputation was originally founded—"The Beauties of
England and Wales," and "A Tour in England," which was
produced by them. This work greatly contributed to extend and gratify
the seat for topographical history by which the early part of
the 19th century was so remarkably characterised. The
illustrations, chiefly copper-plate engravings, directed also
by Mr. Britton, were in numbers, and the beauty of the architectural
eminent of our architectural and landscape draughtsmen and
engravers became qualified for the execution of works of a
higher grade in art. Mr. Brayley himself contributed also
to the progress of the fine arts in a sister direction. Having
become acquainted with the late Henry Bone, R.A., when
that artist was endeavouring to elevate painting in enamel to
the position it subsequently acquired in his bands, as an
integral and a legitimate branch of accepted pictorial art, he
was interested in bringing about this change in art, and
by means of the plate engravers, and the enamellers of the
life, and contributed to the care with which he introduced
into country history—"The Beauties of England," and in his subsequent
works—the more characteristic or interesting features of the
natural history of the localities described. He acquired also
some of that character of occupation which in after-life he applied to good purpose in his archaeological researches, in taking casts of sculptured ornamental impressions of inscriptions, rubbings of engraved monuments from classical statues, and lithographs of those literary
and topographical works generally, that though there were better
geographers and historians, better architectural and decorative
antiquaries, better heralds, critics in art, and bibliographers
there were probably few of his contemporaries—certainly
few of them who could match him in the extent and extent of
the whole of the knowledge of the subjects of all these branches
of literature and archæology to which is termed Topography, i.

BOY. [Roscommon.]

BRACKEN. [Frazis, S. 1.]

BRADINCH. [Devoures.]

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is said by Dr. Horsfield to be intensely bitter; and to be used as a medicine.

BRACKEN. [Frazis, S. 1.]

BRACKES ROCK, a common name for the Allotus crispus,
a plant belonging to the natural order Polypodiaceae. Allotus
is known by its nearly circular sori, which are length con-

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has his best work, was also his last. 'The Topographical
History of the County of Surrey, which he composed and
published at the ages of sixty-eight and seventy-six
during which period the history of the places and objects
described was diligently and critically investigated in the
localities themselves in very many journeys into the country.
For a year or two prior to his decease, gradually increasing
weakness impeded or averted his going to the scenes
which is him by members of his family, but his intellectual
powers remained unimpaired until the period of his death, which
was occasioned by the consecutive fever of cholera, on the 3rd of September 1864, in the ninety-seventh year of his
life, 'in his Paradise,' as he had himself named it. Mr. Brayley
became a Fellow of the Society of Antiquaries of London, in
1834, at the age of forty-six. He was in the prime of his
life, lived to be respected and beloved, and as long as
those years, his surviving children are the eldest son and
daughter.

The following is a list of Mr. Brayley's principal works and
contributions to literature:

1. A Picturesque Tour through the Principal Parts of Yorks
terne and Derbyshire, by the late Mr. Edward Dayes; with
illustrative Notes by E. W. Brayley, 1805: second edition,
and additional notes, 1825.

2. Views Illustrative of the Works of Robert Blomefield,
sculptor to His Britannic Majesty. prefixed to a Memoir of the
Poet's Life, 1806.

3. Copper: illustrated by a Series of Views; accompanied
with Copious Descriptions, and a Brief Sketch of the Poet's
Life, 1810.

4. Descriptions of Places represented in Middlesex, and
illustrative of the History of that County, with Notices and
Biographical Memoirs of the Abbots and Deans of Westminster,
1818-23.

5. The Beauties of England and Wales; comprising some
original delineations, topographical, historical, and descriptive,
of each County, 1810-14.

6. The British Atlas; comprising a series of Maps of all the
English and Welsh Counties; also Plans of Cities and Principal
Towns, 1810.


8. The History of the Ancient Palace and late Houses of Parlia-
ment at Westminster, 1830.

9. Quoted Herdman:--'A Concise Account, Historical and Descriptive, of Lambeth Palace,' 1806.

10. BREAD, DISEASES OF. [Saxony, S. 2.]

BRIDGES. The requirements of railways have led, within
the last few years, not only to the erection of stone and brick
bridges and viaducts, but to the abandonment of the old en-
system, but to a far more extensive use of iron, and the
adoption, in conjunction with its employment, of new con-
structive principles, as well as the bolder, and often novel,
application of old principles already in general use. Of the
stone and brick bridge and viaduct, so long and often
fulsome as works of art, and interesting for their modes of con-
struction, as many of them are, we do not intend here to
speak. Our purpose is to notice some of those great iron
bridges which have been erected, either as temporary or newly
applied principles since the publication of the 'Penny Cyclo-
pedia' and 'Supplement.'

All the bridges we have to describe are applications of the
beam or girder. Crossing indifferently populous thorough-
fares, and navigable rivers and streams, as well as streams and
ways which commercial traffic seldom visits, the railway
bridge or viaduct must often be of wide span, and so
constructed as neither to impede traffic nor interfere with the
flora. By this, neither, the direction nor the level of the way can be
followed, and the space to be crossed must be left as much as possible
unbroken by divisions. The problem for the railway en-
gineer, therefore, was to span the widest area with the least
construction, a matter of course, with the object of economy,
both in cost and in material. The simplest form, was soon found to be
unsuitable. The earliest mode was to return to the most primitive.
One of the earliest artificial bridges, if not the very earliest, was no doubt
a beam or girder, —whether that was the trunk of a tree or a
permanent structure, laid across the stream or place to be
crossed, with its ends resting on the banks or on artificial
supports. And after the invention of the arch, the beam
continued to be used for bridges as well as for innumerable
other purposes. The engineer, as he formed his design, anticipated
the weakness of the beam, except within the narrow
limits, and various methods were invented for strengthening
it by the addition of diagonal and other bars or rods, tech-
nically known as bracings, stays, and trusses. Of these,
beams, girders, as they are called, the general principles and
applications, and the methods employed for determining
their strength, ample accounts will be found in 'The Penny
boys, pp. 144-178; and Matrasiles, Stenof, vol, 15, p. 8.

The principal varieties of braced girders which have been
adapted on account of their weight and stability, are the trellised, the
low-and-string, and the hollow-beam, or tubular: the application of
which will be sufficiently illustrated in the Crumlin
and the Boyne viaducts; the Chestrow and the Saltash;
the Newport and the Britannia; and the Victoria other
bridges. We wish to use a uniform style and scale of the
formulæ, applicable to almost every purpose on which he can
called to exercise his skill.

The principal varieties of braced girders which have been
adapted for railway bridges are the trellised, the low-
string, and the hollow-beam, or tubular: the application
of which will be sufficiently illustrated in the Crumlin
and the Boyne viaducts; the Chestrow and the Saltash;
the Newport and the Britannia; and the Victoria other
bridges. We wish to use a uniform style and scale of the
bridge in the Niagara Falls Bridge.

The Crumlin Viaduct was constructed from the designs
and under the superintendence of Mr. Britton, the engineer,
to carry the Newport Aberavon and Hereford line through
the valley of Crumlin, in South Wales, and to connect the
above line with that of the Tale Vale. With its approaches,
the bridge is a third of a mile long. The bridge itself con-
ists of seven spans, each of 160 feet long, the roadway
in the centre spans being at an elevation of 200 feet. The

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The girders are composed of groups of thin cast-iron columns, each of 17 feet high by 1 foot in diameter, and arranged in tiers of fourteen columns each, cross-braced by wrought-iron ties and cast-iron struts. The central piers are 60 feet, by 30 feet at the base, tapering upwards 84 feet by 16, and contain the main span; they have no less than 540 wrought-iron ties. At the top of each pier is a triangular frame of cast-iron, upon which rest the ends of the main girders. The girders themselves are strengthened by a complete iron arch, wrought-iron arched, among which it would be impossible to explain clearly without diagrams, but which forms an admirable system of trellis trussing. There are four main girders to each span, to which six-inch planking is bolted for carrying the permanent way. The girders are of great size, and, from the extraordinary appearance, yet seems to be sufficiently strong not merely to support the heaviest traffic, but to withstand the most violent storms. It was opened in May, 1867.

Another admirable example of the trellis-girder bridge is the viaduct which carries the Dublin and Belfast Railway over the Boyne, near Drogheda, and of which Sir John McNeill was the engineer. This noble work consists of a centre span of 364 and two side spans of 188 feet each. The girders in the main span, as well as those above spring-ties is 90 feet. It was opened in April, 1856.

The High-Level Bridge, Newcastle-upon-Tyne.—Under Roof, 'Penny Cyclopedia,' vol. xx., p. 147, a cut and description are given of the simplest form of bow-and-string railway bridge. The advantage of such a bridge is that the main girders spring from the abutments, and each is divided into parts of about a-fifth of the whole, as illustrated by the line drawing. The connection of the principle to girders of wrought-iron is noticed. For carrying railways over spaces of unusual width, or at a very oblique angle, bridges of wrought-iron bow-and-string (or as they are by railway engineers so called bow-string) girders were early found to be peculiarly suitable. Other engineers, of an important character, it may be sufficient to mention an excellent one, which carries the North-Western Railway across the Regent's Canal, near the Camden-town stations. A bridge of this kind, by which the North London Railway crosses the Commercial-rod to Stepney; and one, of rather peculiar form, on the Gloucester and Birmingham Railway at Cheltenham. But by far the most magnificent bridge erected on the bow-string girder principle, is the High-level Bridge which unites the towns of Newcastle-upon-Tyne and Gateshead.

When the Newcastle and Berwick Railway was planned, it was felt that a junction with the Newcastle and Darlington line could be effectually only by the construction of a lofty bridge over the Tyne at Newcastle; because the banks of the river at that spot are very steep, and the general level of the railways would not permit of a crossing at a relatively small height above the water. It had long been wished by the proprietors of the line to have a high-level bridge, since the old bridge was adapted only for the low or water-side districts of Newcastle and Gateshead; and Mr. Robert Stephenson boldly designed a scheme which should meet this requirement, as well as the requirement of the railway companies. His plan was to have a double bridge, with a railway line over a common road. The railway companies and the town corporations assented; an Act was obtained; the works were actively commenced about the beginning of 1847; and the bridge was opened by the Queen in person in September, 1849.

The width of the river at this spot is 615 feet; but from the high ground in Gateshead to that in Newcastle the distance is above 1400 feet. The bridge is of six spans, each of 1400 feet, and is the longest of any wrought-iron bridge across the river, and one from each bank; besides minor piers to support the roadway on either side. The superstructure consists of two platforms, an upper, carrying three lines of rails; and a lower, which forms the public road. The lower platform is about 90 feet above the high-water level; the upper is 20 feet higher. Each span or bay of the bridge is crossed by four main cast-iron arched ribs, with horizontal tie-bars. These ribs are disposed in pairs,—the two inner ribs being each 170 feet apart, the space between them forming the carriage road; while between the inner and outer ribs is a space of six feet, which is used for foot passengers. The upper, or railway, platform rests upon the arches, the lower roadway being suspended from them by wrought-iron struts or girders. These struts or girders, which, when put together, give a span of 125 feet, with a rise of 18 feet. In some portions, the ribs are braced by horizontal and vertical bracing frames, while diagonal bracings are inserted in the spandrels, or spaces between the arches and the girders which carry the railway. On the tops of the spannel pillars, girders extend lengthwise, from which others stretch at right angles across the arches, the whole being supported by spandrel girders at least 100 feet in height. Mr. Stephenson at first proposed to meet the requirements of the Commissioners by erecting an iron bridge of two immense arches; but his plan proposed that the arches should be 100 feet high at the spring of the arches, and the Commissioners refused to permit it to be executed unless he raised the level so that the spring of the arches should be 100 feet above the water. As this would have compelled the height of the bridge to be 1400 feet, Mr. Stephenson abandoned his intention, and boldly resolved to cross the channel by a girder bridge. He found a site about a mile on the Caernarvon side of Telford's famous suspension bridge, which was admirably adapted for the kind of structure he contemplated,—the approach to it being on an island, and a strait, or a mere point, about mid-channel a rocky island, which would afford an excellent foundation for a central pier.

The space to be crossed was 1100 feet wide, and each pier of the bridge was, therefore, 550 feet long.

It was necessary not only to provide that the masonry beams, as yet unapproached in bulk, which were to be suspended at an altitude of a hundred feet above high-water, should be sufficiently strong to sustain their own immense weight, and may train in rapid motion, but that they should be able to withstand the action of the fierce gales which are frequent in this locality. It was deemed advisable, therefore, to institute an extended series of elaborate and costly experiments and investigations on the strength of iron, and the manner in which it might be arranged, so as most to conduct to the strength and rigidity of the bridge. These experiments, which were conducted by Mr. William Fairbairn and Mr. Eaton Hodgkinson, called into exercise a union of the highest mechanical and mathematical skill, and not merely sufficed for the immediate purpose, but have afforded a sure basis for the labours of succeeding engineers. The result was the demonstration that the greatest amount of strength would be obtained by giving the masonry beam a peculiar form, and a width which may train in rapid motion, but that they should be able to withstand the action of the fierce gales which are frequent in this locality. It was deemed advisable, therefore, to institute an extended series of elaborate and costly experiments and investigations on the strength of iron, and the manner in which it might be arranged, so as most to conduct to the strength and rigidity of the bridge. These experiments, which were conducted by Mr. William Fairbairn and Mr. Eaton Hodgkinson, called into exercise a union of the highest mechanical and mathematical skill, and not merely sufficed for the immediate purpose, but have afforded a sure basis for the labours of succeeding engineers. The result was the demonstration that the greatest amount of strength would be obtained by giving the masonry beam a peculiar form, and a width which is necessary to the train of the great hollow beams, it was decided to have two or upwards of a quarter of a mile long, placed side by side, one for the north, the other for the south traffic, each of which should rest upon abutments, the intermediate portions being supported across the strait by three massive and lofty stone piers or towers.

The bridge, then, as finally constructed, consists of four spans,—two principal spans, of 460 feet each, which are over the water, and two smaller ones, of 330 feet each, which are over the land. The central, or Britannia Tower, is 727 feet 6 inches above the level of the Low Mersey, and is built on a block of the Monmouthshire sandstone, at the base is 62 feet by 62 (the pedestal of the Monument, being 20 feet square), and it tapers gently to 55 feet by 4 at which height it is 50 feet high. There are 13 arches of the tower, of which 11 are of 144 feet span, and rise to the height of 184 feet above the low water mark; and 2 in near all 20,000 tons; and 387 tons of iron cast from 150 to 200 tons; of wrought-iron girders are built into it. The east and west, or land, towers are similar in general construction to the Britannia Tower, but somewhat smaller, and only 190 feet high; they stand on a base 160 feet by 160 feet, and each tower contains 145,682 tons of masonry and 444,983 tons of wrought-iron, in all near 20,000 tons; and 387 tons of iron cast from 150 to 200 tons; of wrought-iron girders are built into it. The east and west, or Caernarvonshire and Anglesey abutments, are situated inland, at a distance of 300 feet from the strait, and connected with it by a causeway forming a link of the bridge.
est and west towers respectively, and are constructed of massive masonry.

Although the tubes form two continuous hollow beams or tubes they consist in fact of eight pieces, four to each tube, which are joined end to end at the piers. The height of the tubes is 30 feet at the Britannia tower, and diminishes to about 23 feet at the abutments; the upper surface being slightly arched, but the lower horizontal. The clear internal height varies from about 19 feet to 26 feet. The external width is nearly 15 feet, and the internal about 14. The sides, top, and bottom are all formed of wrought-iron boiler plates, varying from 0 to 12 feet in length, from 3 to 20 inches in width, and from 1 to 2 inches in thickness. The metal is wrought iron of the best quality (some of which weigh nearly 7 cwt. each) are laid lengthwise in the top and bottom, but vertically in the sides of the tube. The largest plates are in the bottom, where they are arranged in a double layer. The plates are joined together by rivets; and are stiffened and strengthened at the joints by T-shaped iron, both inside and out, which form vertical bars up the sides, at distances of two feet apart. The connection of the top and bottom with the sides is made more substantial by triangular gusset-pieces riveted in at the corners. The plates in the entire structure are almost incomparably numerous; they are placed four inches apart in the top and bottom, and three inches apart in the sides. They are rather more than 1 inch in diameter, and were driven red-hot into the rivet-holes, and then left to cool for the metal to contract. The metal thickness is nearly three-quarters of an inch; and the bottom and top have proved hard to be pointed out: it is almost unnecessary to mention indeed as an illustration that it is to having been constructed on this principle, that the Lewisham steamer owes the enormous strength which has been so severely tested in the course of its prolonged launch.

The Conway Tubular bridge is a repetition on a smaller scale of the Britannia bridge, but was constructed before it; and was, in all probability, the very first thoroughly tested in the smaller structure before it was applied in the larger.

The Conway bridge consists of a single span of 400 feet clear, the platform of the tube being only 18 feet above the high-water level. The first stone of the masonry was laid in June, 1846; and the bridge was completed and opened for traffic in 1850.

Victoria Bridge, Canada.—A more remarkable bridge as to size and in many other respects than even that over the Menai Strait of a similar superstructure is the Victoria bridge of the Grand Trunk of Canada railway, which is in course of construction across the St. Lawrence, and is expected to be completed in 1860. From shore to shore of the St. Lawrence, the Victoria bridge will be nearly two miles in length, being about five and a half times the whole length of the Britannia bridge. The foundation of the Victoria bridge is on a larger scale than that of the Britannia bridge, the depth below the summer level of the St. Lawrence. The length of the bridge between the abutments is 8000 feet. The engineer is Mr. M. Ross.

Chaputon Bridge.—In this bridge, which carries the South Wales railway across the river Wye, near Chepstow, Mr. Brunel has employed two kinds of trussed girders, and also applied the rigid suspension principle. In one portion of the bridge wrought-iron girders 100 feet in span, and of the ordinary form, rest on cast-iron columns; while in the other portion, which is 305 feet in span, the trussed girders are sustained by chains, the tension of which is resisted not, as in an ordinary suspension bridge, by being fixed to the ground at either end, but by attachment to a horizontal wrought-iron column or strut, 9 feet in diameter and 10 feet in height. These are the belts and ties which rest on the towers at the ends of the bridge. The chain consists of three straight links only—its rigid form being maintained, and the flexure of the horizontal cords being supplied by the tension of the chains. The deck of the bridge is formed by 12 beams riveted to 8 wrought-iron columns. The girders which carry the roadway have only two points of suspension, one at each end of the bridge, and they are suspended from an arch formed by wrought-iron columns. The transverse girders are light, of 87 feet above the ordinary low-water level, but owing to the remarkable rise of tide here, only 46 feet above high-water. The towers at the ends of the bridge present no peculiar features, but the middle one rests upon a pier formed by six enormous cast-iron
cylinders which pass through 50 feet of soil to the solid rock beneath. They were sunk to their positions by the removal of the mud, and the pressure of their weight, (in the manner of Roman swivelled trees,) forced the cylinders into the rock. A somewhat similar combination of the rigid suspension principle, with the tubular form, is being carried out in Mr. Brunel's Royal Albert Bridge, at Saltash, near Plymouth, which is intended to carry the Cornish railway across the river. The bridge is to consist of two sections, connected by a Meeth Downderry line. The total length of this bridge is 2200 feet, the principal spans are each 455 feet, and the height of the railway above high-water level is 100 feet. The centre tower is built of solid granite to a height of 12 feet above high-water mark, upon this rest four octagonal cast-iron columns which carry the standards upon which one end of each tube rests; this tower rises to a height of 240 feet above the foundations.

The principal side piers are of solid masonry, and carry the bed plates and rollers upon which rest the other ends of the tubes, and which permit their free expansion or contraction under the influence of variations of temperature. The tubes are similar in principle to those of the Britannia bridge, and like the latter, after being constructed at the river side were floated out on the river, and then placed on the towers, and thence gradually lifted by hydraulic pressure to their ultimate position.

Niagara Falls Suspension Railway Bridge. The most remarkable application of the suspension principle, for railway purposes, has been made in the bridge constructed across the Niagara river, by Mr. J. A. Roebling, in order to carry the railway, and also the ordinary carriage and passenger traffic across that river. The space to be crossed was about 820 feet, and the level above the water 24 feet. From the nature of the locality it was necessary that the bridge should consist of a single arch or span, whilst the erection of scaffolding or the floating of portions of the structure would have been impracticable. Hence a suspension bridge appeared to be the only available form of structure. But any other than rigid bridges had been shown to be unsuitable for railways, and it became necessary to overcome the flexibility inherent in suspension bridges of the ordinary kind. This the engineer has successfully accomplished, and the bridge which links the British possessions with the United States is, confessedly, one of the most remarkable achievements in modern engineering. The main beam, slightly curved in form, is 25 feet wide at the bottom, and 24 feet at its top, 18 feet high, and 821 feet long from the centres of the towers. Along the bottom of the ordinary passenger traffic is carried; along the top runs the railway. Separate systems of wire cables, two sets in each span, support these two different types of roadways, which are constructed of timber beams. The roadways are connected by double trusses so arranged that their resistance acts in opposite directions, upwards as well as downwards. The beams of the two floors are connected by posts, which serve to transmit the depressive action of loads from one floor to the other. The posts are trussed together by diagonal rods. By these simple arrangements in combination with the tubular form of the bridge, a considerable increase of rigidity is obtained. To maintain horizontal stability the upper cables are braced laterally, and they are diagonal stays of wire above and below the floors. Fifty-six stays from the lower floor to the ends of the bridge are strung and anchored in the rocks. For the secure anchorage of the cables, expansion and contraction from variation of temperature, high winds, &c., it is needless to say careful provision is made. The railway traffic passes along the centre of the upper floor, the common wagon traffic along each side of the lower floor. The anchorage was commenced in September, 1852, the bridge was opened for traffic in March, 1855. The total cost was under 400,000 dollars. The bridge answers its purpose perfectly; but it must not be supposed that this has proved the suitability of the suspension principle for railway purposes in all circumstances. In this case the river being unnavigable, the engineer has been enabled to obtain stable rigidity by the use of an extended series of stays below the roadway, securely fastened to the piers by chains and to the bed of course by immovable piers, and additional cases. And although by the judicious application of the tubular form, and the use of a happy combination of trusses, girders, stays and weights, a remarkable amount of rigidity has been obtained, it is yet considered unsuitable to be trusted with the traffic of more than three miles an hour. At that rate when a train of 326 tons is passing over it, the bridge only can bear the exten- sion of 10 inches, and the roadway assumes its original shape immediately the train has passed.

Foundations of Bridges. To our notice of new principles applied in constructing the superstructure of bridges, it may be added, that whatever importance may be attached to the new expedients adopted in forming the foundations. Until recently, in order to build the foundations of piers and abutments of a bridge under water, one of two plans was adopted: the first was to construct the pier, using for the purpose of a cairn, a wooden dome, or wooden dome, tight enclosure from which the water was pumped out, to allow a firm and dry foundation to be laid,—this plan was to plan adopted at London and Waterloo bridges and in many other bridges of an important character; the other, and much less costly, though less stable method, was to surround the platform on which the foundation of the pier was built with water-tight sides, and thus make a large water-tight basin, or caisson, the sides of which, when the platform was sunk to its proper level could be detached, the bottom or stage working as a foundation—this was the method used in constructing the piers of the old Westminster bridge. (Coffin's Penny Cyclopaedia, vol. vii. p. 394.) Coffin-dam and caisson were of course modified in form according to situation, and the method of construction according to the views of individual engineers; but wherever used they have been the same principle. A more economical and less tedious system, one which should be equally durable, has long been desirous of being evolved, but had not only the approval of engineers, but also the approval of the public. A plan, which was uniformly carried out in practice, as far as construction goes, with which there seems no reason to doubt their permanent stability, has been adopted both in this country and on the continent, where coffin-dam and saddle have been dispensed with. Piles and concrete, cased in this
have been used in Brussel's railway bridge at Chepstow described above, and in various parts of the continent; and the same materials may, according to requirement, as in the bridge at Ronen, and the bridges of Jena, Austerlitz, Alma, and Victoria over the Seine. Cast-iron as an outer casing, in various forms, and with concrete or other materials as the filling, has been used in England and Ireland in numerous instances. In the Alma bridge over the Seine, having a length of 470 feet and seven arches, the piers are founded on piles driven into the bed of the river over the whole area. The space between the piles is filled in with concrete and rough stones, the whole is enclosed by wooden sheet-plighting, and is protected from the river by high rough stones. The Suspension bridge at Chelsea was built by enclosing the area by piles and iron plates, driving wooden piles at short distances over the whole space, and filling in with concrete, and of course without using either cast-iron or casings; and the new bridge at Westminster is being built by the same engineer, Mr. T. Page, on a similar principle. In the Town bridge and the Railway bridge recently erected alongside of each other at Rochester, the piers are supported solely by a number of cast-iron cylinders, filled with brick-work and concrete. A description of the methods adopted by Mr. Page at Westminster bridge, and by Mr. Hughes at the Rochester bridges, will serve to indicate sufficiently the direction taken by civil engineers in this branch of their practice. It is observed, by the writer, that the economy in cost, partly on that of saving in time, but chiefly perhaps in order to avoid the excessive obstruction of the water way which would have arisen from building a bridge of several arches close against one another, or when a still larger number of arches, the piers of which would not coincide in position with those of the new,—not to use coffers-dams in constructing the piers of the new Westminster bridge, the system proposed by the engineer, Mr. Page, was examined and approved of by the Bridge Commission. Mr. Page, which is being carried out as rapidly as circumstances permit, was to drive a number of bearing-piles over the whole area, to a sufficient depth in the clay, but to leave them standing at some considerable height above the gravel, as the base of the pier; to enclose the area between the piles and the gravel, with round hollow iron piles, and flat plates alternately, the former sustaining the latter by grooves, and all driven down to a sufficient depth; to dredge out in the spaces between the bearing-piles to the hard gravel; and to fill up all the spaces and area in the casing up to the level of the tops of the piles, with concrete made from Portland cement, which has the property of setting under water, the concrete being deposited through the water by means of shoots. The casing was previously tied together, across the intended pier, by iron bolts. This system of construction was to terminate at or near the low-water line. Blocks of granite were to be fixed over these piles, cemented, and in, and the whole to be levelled off to receive a heavy bed of granite capping, or rather base course, above which the pier would be continued in brickwork faced in granite, to finally support the building, as indicated in Plan. The works in course of execution are of course retarded by the rise of the tide; but otherwise, though below water, they are conducted above it, except as to the requisite inspection, the attachment of the iron ties, and the bond in similar cases where the diving-bell or the diving-dress is used.

The 145 bearing-piles in each pier of Westminster bridge are driven to an average depth of 29 feet 6 inches below low-water line. The piles, each 24 feet 8 inches in length, are driven 25 feet 9 inches below low water, and to make up the height, they are surrounded with sheet-iron slabs, which, consequently with the upper part of the round piles, are part of the casing. The bearing-piles are thus 22 feet below the average level of the casings of the old bridge, and the cast-iron piles and plates are respectively 10 feet 9 inches, 14 feet 9 inches, and 16 feet 9 inches below the low-water mark. The space external to the pier is intended to be provided by a solid mass or bank of concrete round the pier; this concrete when set forming a kind of artificial rock, which is found to be of the same durability as old iron. When this concrete a trench is dredged out to the clay, and it is proposed that it shall have a thickness of five or six feet; so that, should it endure, as the hardness and heaviness of the mass would make probable, the flat piles would be always underground, and at the junction of the floors of the piers could be no escape of the gravel. Mr. Page further proposes to dredge out the channel under the arch to a regular curve, commencing at three feet below low water at the piles, laying bare the clay at the centre, so as to give a low-water depth there, and allowing a certain superincumbent head in preparation to keep up the circulation of the stream of the tides, that the tendency would not be to scour at Westminster bridge, but that the first operation would rather be to fill up. The entire cost of constructing the foundations of Westminster bridge on Mr. Page's system is estimated at about 60,000£, less than by the employment of coffer-dams. A peculiarity in the construction of the new Westminster bridge is that, in order to save the usual expense of building a temporary wooden bridge, the new bridge is to be erected on its circuit form works on the site of an old one, only one half of the bridge—the western—is in the first instance to be built along side of the old structure, which is during its progress to be used for the ordinary traffic, the old bridge being then to be used for traffic, the old bridge is to be demolished, and the other, or eastern half of the new bridge erected on its site. This necessitates the construction of the piers, as well as of the bridge itself, in two parts, at intervals of time, and doubts have been expressed whether there are not in consequence likely to be unequal settlements in the completed structure. Mr. Page has, however, suggested arrangements for the formation of the piers, and for the introduction of peculiar bracings in the coupling together of the two parts of the superstructure which will afford sufficient provision for any inequalities of subsidence.

In the system of Mr. J. Hughes employed in forming the foundations of the Town and Railway bridges which cross the Medway side by side at Rochester, the piers are supported on cast-iron cylinders, which were sunk down to the hard chalk by using each cylinder as a diving-bell. A somewhat similar principle has been applied to other bridges, and there are different claims to the invention of the principle. In the Medway bridge the invention of M. L. Potts, the sinking of the cylinder was effected by the exhaustion of the air contained within it, but though that method has been adopted in some cases, it has not met with general success. Mr. Crewe proposes an extinguishing of the air by the blowing of hollow cylindrical piles through sand by means of compressed air, to M. Triger, who thus sank a shaft through a quicksand 66 feet thick, on the banks of the Loire. But the actual conversion of the cylinder into a diving-bell is, in which the workmen carry on their operations, the diving-bell then forming a part of the permanent structure, is an
extension of the principle which is due to the ingenuity of Mr. Britton.

The Railway and Town bridges are both borne on abutments at the banks, and two piers in the bed of the river. To sustain the abutment on the Strood side 30 hollow cylinders were used; for the Rochester abutment 12, and for each of the two piers 14, making in all 70 hollow cylindrical piles, each 7 feet in diameter. The piles are respectively 70 feet long and 17 feet wide, and the cylinders are set at distances of 9 feet apart lengthwise, and 10 feet transversely. The bed of the river was found by boring to be composed of clay, sand, and gravel, overlying hard chalk, which appeared at a depth of 44 feet below high-water level. On this hard chalk the cylinders were to be based. To reach it for the Strood pier a mass of hard stone, part of the foundation of the original wooden bridge, had to be first planed off, and this was done by exhaustion which was evidently impracticable here. To ensure a firm foundation workmen must excavate the stone, gravel, &c., in order to prepare a passage for the descent of the cylinders, and then to secure their stability fill them with brickwork as soon as they were in the positions they were ultimately to occupy.

The cylinders were in lengths of 9 feet each, the diameter as already mentioned being 7 feet. Operations were commenced by dropping cylinders, containing long pieces of hollow cylinder into a diving-bell, by secretly bolting to one end of it a wrought-iron cover. Through this cover were two cast-iron air-locks (or chambers bearing a certain resemblance to the locks of a canal), with air-tight flaps or doors, by means of which the workmen were admitted to the cylinder, the excavated materials were passed out, and the brick and concrete passed in. Separate cocks, one under the control of a workman inside, the other under the charge of a workman outside, permitted the water and the bricks to be sent in or out of the buckets outwards or inwards, the filling of the chamber with compressed air, &c. There were besides a great number of ingenious appliances for the convenience of the workmen and to facilitate the various operations, which it is not possible to describe here, but which are fully described and illustrated in Mr. Hughes's Memoir on the subject, and in the Supplement (1856) to Mr. Curgy's 'Encyclopedia of Civil Engineering.'

A substantial timber stage having been erected over the site of the pier, and steam-engines and air-pumps conveniently placed, the prepared cylinder was connected with an air-pump and with various apparatus was lowered to the proper position on the bed of the river. "The working of the water was commenced by means of the pumps, which, by means of the flap of one of the air-locks and the door of the other being closed, a few strokes compressed the air within the pile [or cylinder] sufficiently to seal the joints; and every subsequent stroke delivered an additional quantity, until the cylinder was sufficiently compressed to expel the outside water and to leave it bottom dry. Fifteen feet of water was cleared out in five minutes; and whilst the pumping continued the workmen passed through the air-locks to their respective stations; and as the excavations proceeded, the material, sent up in buckets, was discharged into lighters placed alongside. During the time of shallow water, the pile descended as rapidly as the excavations below would permit it; but when the water was deep, and the weight of the pile and elasticity of compressed air contained in it were nearly in equipoise, the excavation was carried down 14 inches below the edge of the pile, when it would at once descend through the whole space as soon as the pressure was removed."

('Curgy's Encyclopedia of Civil Engineering,' p. 1697.)

While the cylinder was thus sunk 9 feet, the cover, with the air-chambers, was lifted off, and another 9 feet length of cylinder was bolted on to the first, the air-locks being now fastened to the top of the upper cylinder. The air-pumps were again set in action, and when the pressure was repeated, the cylinder sank another 9 feet. These operations were repeated till the necessary depth had been reached, when the cylinders were filled with brickwork and concrete. In the Strood pier nine lengths of cylinder were placed on each side of the central pile, excepting the middle one, which, being left unchafed above it was surrounded by soft chalk; the third by Kentish rag stone; while about half of the fourth was above the bed of the river.

Furnishing the foundations of bridges, but more particularly of lighthouses, landing-stages, beacon-houses, breakwaters, and other structures which have to be based upon sand or soft ground, hollow cast-iron screw-piles, the invention of which has been the subject of much attention, have been used in the above structures. These piles have the lower end converted into an anchor-screw, which enables the pile to be screwed with great facility through shingle, sand, &c.; while the upper part of the worm may be expanded into a disc, varying in breadth according to the character of the soil, and the height of the piles greatly the firmness of its hold. The value of these screw-piles is very great in situations where the loose sandy soil is incapable of supporting any solid structure, or where the action of the waves quickly undermines any work based on ordinary piles.

BREISGAU. [Braugsau.]
BREDARY. [Electio, S. 2.]
BREDY. [Morele.]
BREE. [No slip.]
BRIEL. [Le Bresson, W.]
BRITANY. [Britagne.]

BRITTON, JOHN, was born July 7, 1777, at Kingston St. Michael, near Chippenham, Wiltshire, where his father was a small farmer, and kept a vintners shop. His parents dying early, he was received as a servant by an uncle in London, who after a while apprenticed him to a wine-merchant. After having served six years, his health gave way, and his master agreed to cancel his indentures. Young Britton then returned to Chippenham, and from his early acquirements in arithmetical instruction, and during his apprenticeship he had become extremely fond of reading, but his reading was dawdling and aimless. On reaching manhood he was still undecided, and his mind quite unformed. At the close of his apprenticeship he was to have set out for India, but without any definite permit. For some years he had to struggle hard with poverty, and was driven to a variety of shifts to earn a livelihood. Among other things, he engaged himself for a time as a servant in housekeeping, and in the course of a few years he collected the sound title of Eledophnikos. During this unsettled course of life he formed the acquaintance of various persons connected with the humbler walks of literature, and he was induced to embark in a small way on authorship himself, by a comparative success of some sort which are in that line, and at length ventured on writing an 'Account of the Surprising Adventures of Pizarro.' Some short notices which he prepared for the 'Sporting Magazine' brought him acquainted with Mr. Whible, its publisher, and to the connection thus formed was afterwards added the pleasing title of a correspondent of the 'British Magazine.' After a time Mr. Whible solicited Mr. Britton to write for the 'Account of the Surprising Adventures of Pizarro,' and this, after a time, led him into the career of a writer of travel...
antiquities. It would occupy too much space to enumerate its many publications, which in his own chronological list, he places in his 'Life' in an alphabetical arrangement of seven distinct productions. The most important of them is the 'Cathedral Antiquities of England,' a magnificent work, which was commenced in 1814 by the publication of a detached form of the 'Antiquities of Salisbury Cathedral,' and completed in a series of articles in 'The Builder,' and of the entire cathedrals of England. In its completed form the 'Cathedral Antiquities' occupies 14 vols. fol. and 4to, 1814-35, with upwards of 300 highly-finished steel-engravings.

The production of these works was carried on throughout the whole of the author's life, and, as he had retired, some of the artists working in his own house, and being trained to the work by himself; and the facility he thus acquired in the production of this class of publications led to the preparation of many other works of a similar kind. Among the illustrated works of which he was either author or editor may be named—an 'Historical Account of Corsham House,' 1806; the 'Fine Arts of the English School,' 4to, 1812; 'Historical Account of Redcliffe Chuch,' 4to, 1813; 'Illustrations of Ponthill Abbey,' 1823; 'Historical Account of Bath Abbey Church,' 1825; the 'Public Buildings of London, from drawings by A. Pugin,' 2 vols. royal 8vo, 1825-26; 'Architectural Antiquities of Norman, drawn by A. Pugin,' 1825-27; 'Pictoresque Antiquities of English Cities,' 4to, 1830; 'A History of Architecture,' 4to, 1831-32; 'Architectural Antiquities of the Middle Ages,' 4to, 1832-38; 'A History, &c., of the Ancient Palace and Houses of Parliament at Westminster,' partly with E. W. Brayley, 8vo, 1834-36; 'Historical Account of the most admired edifices in the Countries of the British Isles,' 4to, 1842; &c. &c. But besides these Mr. Britton wrote on many subjects connected with general literature, either as distinct works or as contributions to literary journals, &c. In biography he published in 1846 a 'Biography of an Aubrey,' and in 1848 an essay entitled 'The Authorship of the Letters of Junius Elucidat, including a Biographical Memoir of Colonel Barré, M.P.' Mr. Britton wrote the articles 'Avehny,' 'Stonebenge,' and 'Tomnillus,' for the 'Fenny Cyclopedia.'

In another friend, Mr. Britton gave the veteran author a dinner on his retirement from the active, permitted of his calling; and it being determined to mark their esteem for him by a permanent testimonial, a social gathering called the 'Britton Club' was organised to carry out the project. The form of the testimonial, at Mr. Britton's own suggestion, it was eventually agreed should be an 'Antohography,' which he was to prepare and to print with the testitual funds. Despite of his advanced age, Mr. Britton completed his task; and several of the parts of his 'Antohography' were published, but he died before the work was completed, January 10, 1857.

Mr. Britton was not a man of marked originality or great mental power, but as a careful and diligent writer in a branch of his great interest, which he cultivated with indefatigable industry, the antiquaries, he did excellent service in calling the attention of the educated public to the long-neglected topographical and architectural antiquities of England; and there can be little doubt that his elegantly-illustrated works have been a chief exciting cause in bringing about the improved state of public feeling with reference to our national antiquities. The career of Mr. Britton was moreover an admirable illustration, as he himself describes it, "of what may be effected by zeal and industry, with moderate talents, and without academic learning."

BROCKVILLE. [Canada, S. 2.]
BROMAL [Chemistry, S. 1.]
BROMLEY. [Yorkshire.]
BROMLEY, ABBOTS. [Staffordshire.]
BROMUS, a genus of plants belonging to the natural order Gramineae, and the tribe Festucae. It has unequal many-flowered herbaceous glumes, the lower being 1-nerved, the stipules 3-nerved, and the leaves divided half way down. The species are generally known under the name of Brome-grass, but 'a mnemonic, and in the botanical dictionaries of those days, and expressed.

The outer palea short, (annually) founded on three stems below the tip. The styles below the summit of the fruticulat. The sheaths of the leaves divided half way down.

The species are generally known under the name of Brome-grass, but "a mnemonic, and in the botanical dictionaries of those days, and expressed.

B. erectus has an erect stem two or three feet high, and grows on dry sandy and chalky soils. It is known from the other species by the outer pales being indistinctly 7-nerved and one-third longer than the smaller glume. B. esser has its outer palea hairy and 5- to 7-ribbed, with the leaves broad and hairy. The stem reaches a height of four or five feet. It grows in damp woods and thickets.

B. sterilis is a common plant in waste places, and is known by its outer pales having 7 distinct equidistant ribs. It has large flat broad pinnate leaves, and a stem from one to two feet high. It grows in waste places.

B. distans is remarkable for its erect panicle. It is a rare plant.

Some of the species, as B. purgans and B. catharticus, are purgative, whilst B. molotis is said to possess poisonous properties.
journeys and labours to acquaint himself with the best productions and masterpieces which would alone have sufficed to occupy any ordinary man. The results of his long experience appeared in 1840 in his "Traité des Arts Céramiques." And carrying out his earliest researches on enamelling, he revived at Sévres the almost lost art of painting on glass. He found time, however, to share in the discussions of the Institute, and in promoting the interests of science, and the views of scientific inquirers. He died on the 14th of October, 1847.

Broumont was a foreign member of the Geological Society of London, and other learned societies, and his writings are to be found in the "Mémoires de l'Académie des Sciences," "Annales des Mines," 'Annales de Chemie,' and "Annales des Sciences Naturelles.

Many have been published in a separate form. Among them 'Essai d'une Classification des Regne Animal en quatre Classes,' 1823; 'De l'Imitation de la nécrophile des Roches métamorphiques,' 1813; 'Mémoire sur les corps organiques fossilisés nommés Tribolites,' 1814; 'Histoire Naturelle des Crustacés fossiles sous les Rapports zoologiques et géologiques,' 4to, 1822 (jointly with Desmarest); 'Introduction à la Minéralogie,' 8vo, 1823; 'Tableau des Terres qui compose l'Encyclopédie du Globe,' 8vo, 1829; 'Premier Mémoire sur les Kaolins, on Argiles à Porcelaine,' 4to, 1830; 'Second Mémoire sur la Naïlre et l'Utilisation des Argile,' 4to, 1841.

(1818 - 1847)

BRONTÉ, CHARLOTTE (Mrs. Nicholls, better known by her pseudonym Currer Bell), was born April 20th, 1816, at the parsonage of Branego, near Haworth, West Riding of Yorkshire, of which her father, the Rev. Patrick Bronté, had then the living. He afterwards held the living of Haworth, also in the West Riding, about four miles from Keighley. Mr. Bronté removed from Thornton to Haworth, February 12th, 1820. Charlotte Bronté was born at Haworth in February, 1819, went to Brussels, in order, by acquiring a better knowledge of the French language than they already possessed, to qualify themselves for keeping a school. On the 11th of July, 1831, the end of her course, it was thought necessary to return to Haworth. Emily Bronté remained at home, but Charlotte returned to Brussels in the beginning of 1843. She was engaged as teacher of English in a school for young ladies, completed her education in French, made considerable progress in German, and returned to Haworth at the end of 1843.

The novel entitled 'Jane Eyre, by Currer Bell,' published in 1847, was the first production of Miss Bronté's pen which caught public attention, but it was not her first venture in authorship. Her first essay was in a little volume of 'Poems by Currer, Ellis, and Acton Bell,' 1846, of which the poems passed almost unnoticed, but the success of the novel was immediate and extraordinary; and curiosity was for some time exercised not only as to its paterinity, but as to the identity of the three authors. Many people bearing manifestly the traces of a woman's mind, yet the general cast of thought, was urged on many sides, was as evidently unfeminine. The appearance almost simultaneously of other stories, marked by the same peculiarities of thought and general style, with the names of Acton Bell and Ellis Bell as their authors, served to stimulate still further the public curiosity, and when it was officially announced that Currer Bell was the daughter of a clergyman in a remote part of Yorkshire, and that the three sisters, Emily, Charlotte and Anne Bell were her sisters, there was a general feeling of surprise but, as alluding to incredulity. In truth, 'Jane Eyre' is a remarkable work, and as the production of the daughter of a country clergyman, it would be still more remarkable if it were necessary to suppose it accompanied with so wide acquaintance and so intimate knowledge of the human heart, and to portray diversities of character. 'Jane Eyre' was followed in 1849 by 'Shirley,' and that in 1853, by 'Villette,' both marked by the same vigour of intellect, and keen, in fact more marked, a consistent creation of characters. The motives, though with less of that somewhat wayward originality which had in her first work called forth so much adverse criticism, but at the same time had excited such intense sympathy.

What is unpleasant, painful, morbid in these powerful novels may, there can be little doubt, be set down to the action of disease upon an overwrought and intensely susceptible mind. Young as she was at her death, she was the last surviving of her brothers and sisters, and all her children. Emily Bronté (Ellis Bell), the author of 'Wuthering Heights,' next to Charlotte the most gifted of the sisters, died Dec. 19, 1848. Anne Bronté (Acton Bell), the author of 'Agnes Grey,' died May 28, 1849. Miss Bronté married in June, 1854, the Rev. Arthur Bell Nicholls, her father's curate; but pulmonary disease, the same insidious malady which had carried off her sisters, had already marked her as its victim. She died at the parsonage, Haworth, on the 31st of March, 1855, leaving her husband and two children.

The "Professor," a Tale by Currer Bell," a novel written in 1849, but laid aside and much of it recast to form 'Jane Eyre.' The "Tale of the Professor," 4to, 1857, has been published by Mrs. Gaskell.

BROSSÉA, a genus of plants, belonging to the natural order Eriocéace. The fruit of B. coquina, like that of Gaultheria procumbens and Arctostaphylos alpina, is succulent and greyish; it is a small, narrow, ovoid, berry-like fruit, about 1 millimetre in length, which is utilized in the manufacture of confitures. Several species of Gaultheria, with a similar fruit, are cultivated for the same purpose.

BROWN, CAPT. SIR SAMUEL, R.N., was born in London in 1776. At the age of eighteen he entered the navy, and served with distinction during the French war. He passed through the successive grades in his profession, rising to the rank of commander in 1811, and accepting that of retired captain in 1842.

It is however as a civil engineer that Sir Samuel Brown has claim to remembrance. To his ability and ingenuity may be traced the construction of the first iron suspension-bridges. The idea of substituting iron cables in the place of those made from hemp, first occurred to M. de Bougainville, whose account of a voyage which he made round the world was published in 1771. [Bougainvillius, J., Tableau du voyage de Bougainville, 1771.] He was, however, content to propose a suspension-bridge for a line of high mountains. A patent for this suspension-bridge was granted him, though a patent was taken out by a Mr. Slater, a surgeon in the British army, in 1808, little was done until Captain Brown carried out a series of experiments, the results of which were so satisfactory that the Board of Admiralty ordered him to carry out an iron suspension-bridge. Their use, it need hardly be added, has since become general. Iron suspension-bridges had, as is well known, been erected in several instances both in America and Europe before Captain Brown was the first to apply this construction to the wants of the British army, and it was generally regarded as insecure, except for crossing narrow streams, until Brown introduced his improved method of constructing chains for suspending the roadway. Instead of chains of the ordinary construction, he proposed to form them of long bars of flat or round iron, pinned together by short links and bolt-plugs. He made a model of his invention in 1813, having however designed and prepared specifications for suspension-bridges much earlier, but he did not obtain his patent till 1817. Brown's plan was soon adopted in Germany and other countries, and a patent proposed to use cables of merely the ordinary construction in the erection of his magnificent bridge over the Meuse Strait. The first extensive bridge erected wholly on Captain Brown's plan was the bridge which crosses the Tweed at Berwick, in which the length of the chord-line between the points of suspension is 409 feet: it was opened for use in July 1820. In 1821 Captain Brown commenced the construction of the Trinity suspension-pier at Newhaven near Edinburgh. He subsequently erected several other bridges and piers, but it may suffice to mention, as his greatest work, the suspension-pier at Brighton, which consists of four openings of 265 feet each, with a deflection of 18 feet. The Brighton pier has suffered considerable damage on two occasions, but has never been strengthened, and it has successfully withstood others of excessive force.

Captain Brown was knighted in 1835. He died on the 15th of March 1852.

BRUNEL, SIR JAMES, 11.

BRUNEL, SIR MARK ISAMBARD, was born on April 25, 1799, at Hacquerville, in the department of L'Est, a few miles from Bonen. His parents, who were respectable agriculturists, had four children, of whom he was the eldest. From his earliest boyhood he was occupied with mathematical and mechanical pursuits; and on being sent to the seminary of St. Niciaise at Bonen, preferred the study of exact science, mathematics, mechanics, and navigation, to the classics; and during his stay there, which was never longer than when buying himself in a joiner's workshop. He familiarised himself with the tools and some of their applications, and when but twelve years old was already proficient in turning and in the construction of models—ships, machines, bridges and other structures. This was little gratifying to his father, who would have preferred to see his son in the church or in the merchant's office.
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On leaving the seminary at the age of fifteen, Bruel passed some time in the family of M. Carpentier, a friend of his father, at Rouen; and went through a regular course of lessons in drawing, perspective, arithmetic, and algebra, to so much interest in the astronomical part of his practical studies, that on his visits home he set himself to observe the stars, greatly to the astonishment of the villagers. He made an octant, guided by the one belonging to his tutor, and a telescope on a fixed tripod, and, having started a little factory, he studied the instrument, and constructed another of ebony, which enabled him to take trustworthy observa-

tions.

He commenced perhaps by M. Carpentier, who had been a trading captain, Bruel enlisted as a sailor in 1766, from which date up to 1783 he made several voyages to the West Indies. He was remarkable for his skill, intelligence, and good humour with which he discharged a seaman's duties; won good opinions for his honesty and temper, and his compan-

dies by using instruments of his own construction, and by making a pianoforte while the ship once lay at Guadaloupe.

During a visit to Paris after his last voyage in 1793, Bruel restored to raise his voice in one of the political clubs against the ferocious doctrines there actively pronounced, and thereby endangered his personal liberty; but, obtaining per-

mission from the minister of marine, he escaped to America, hoping to find employment for his abilities in a new country.

Bruel was appointed a fellow of the Royal Society in 1784. Bruel was always a liberal supporter of the party of his countrymen who were about to explore the wild and unsettled regions bordering on Lake Ontario, to survey the lands of a French company. The operations were carried on for two months, during which the party, seven persons in all, were driven for a considerable time by the weather, and gained great distinction.

In 1794 Bruel was appointed, conjointly with one of his fellow-

explorers, to survey for the canal which now connects Lake Champlain with the Hudson River. This was a very difficult task, in which his fertility of invention and readiness in overcoming difficulties were strikingly manifested, his career as an engineer may be said to have begun. When designs for the houses of congress were called for he sent in one of which, though the most simple and economical, was well received and magnificent for simple republicans. He afterwards acted professionally as an architect, and among other works built and fitted up one of the principal theatres of New York. It has since been burned down.

He was employed on the fort erected for the defence of the city, and in the establishment of an arsenal and foundry, where his ingenious contrivances for boring cannon and moving large masses of metal with facility, showed how successfully he could bring new ideas to bear.

In the family of his friend Carpentier, at Rouen, Bruel had become acquainted with Miss Sophia Kingdom. This acquaintance, and a desire to work among the scientific engineers of Europe, drew him to England. He married Sophia Kingdom, who, being at that time a lady of considerable fortune, produced an autographic machine, designed to copy drawings, maps, and written documents. Soon afterwards, he submitted to government a plan for making block-pulleys for ships by machinery, and was employed to carry it into execution in the dockyard at Portsmouth. The impugnity of this contrivance is not less remarkable than the accuracy and economy with which its operations are performed. It comprises, so to speak, sixteen different machines, all driven by the same steam-power; twelve of which cut as many logs of elm or ash into the shells of blocks of any required size, while nine fashion stems of lignum-vitis into poularies or saws, and form the iron pin, which being inserted, the block is complete. Four men with this machine turn out as many blocks as four-score did formerly, and at less cost. The supply has never failed, even in time of war, though 1600 blocks are required in the rigging of a single ship of the line. It results so satisfactory produced a corresponding liberality on the part of the government, and Bruel's respect, as he thought, beyond his expectation. The steam saw-mill in Chatham dockyard was erected by Bruel. The success of the circular saws there introduced led him to further improvements, by which in the cutting of veneers double the usual number could be obtained from a given thickness of wood. These seamless shoes for the army, which, after two years' trial, was given up from an economical motive. Among other inventions may be enumerated a machine for making wooden boxes; for nail-making; to twist, measure, and form sewing threads into bands; for rolling paper; a contrivance for cutting and shuffling cards without the aid of fingers, produced in reply to a playful request of Lady Spencer's; a hydraulic packing-press; new methods and combinations for suspen-

ding and for riveting iron and steel in wood; a method of fixing iron plates and flat anchors without centers. He was employed in the construction of the first Ramagate steamer, and was the first to suggest the advantages of steam-tugs for the Admiralty. He con-

structed a machine for using carbuncle acid gas as a motive power, and obtained a patent; also, for his son, several experi-

ments, for more than ten years, in the endeavour to bring it to perfection. Most of the mechanical difficulties were overcome; but although an intense power was obtained, and with a very low temperature, the economical advantages, as compared with the cost of the vapour of water, did not appear to be such as to compensate for the increased cost of the machinery, and the usual difficulties in its use.

Bruel's works of engineering construction are to be found in different parts of the United States. In 1810 he wrote a treatise on the subject which is most popularly known as the Thomas Tunnel. This great work, commenced in March, 1825, was successfully accomplished, notwithstanding the accidents, obstacles, and overwhelming difficulties that hindered its progress. The water broke in more than once, and flooded the whole of the excavations. Bruel, however, proved himself equal to each emergency, and his persevering genius at length triumphed.

The tunnel was opened to the public in March, 1843.

In 1796 Bruel was admitted a fellow of the Royal Society, in 1814, and was chosen on the council, and appointed vice-president in 1832-33. He was a member also of other scientific socie-

ties and institutions. The honor of knighthood was conferred on him in 1841. With advancing years he became more and more attached to his lady, with whom he resided at the same house during the whole of his life. Bruel was, however, one of the most confidential friends, and was enabled to know him personally, could appreciate his simple and noble character.

[Traite de l'Academie de Rouen; Proceedings of the Royal Society; Proceedings of the Institution of Civil En-

gineers; Quarterly Review.]

BRUSA. [BUSA.]

BRYDGES, SIR SAMUEL EGERTON, Bart., was born November 30, 1725, at Wootton Court, Kent. His father was Sir Edward B. Bart., one of the judges of the admiralty, and his mother was the daughter and co-heiress of the Rev. W. Egerton, LL.D., Prelate of Canterbury, &c. Young Brydges was educated first at Maidstone Grammar School, and afterwards at the King's School, Canterbury, whence he proceeded to Cam-

bridge, entered Trinity College, where he was made a fellow, and left the University without taking a degree; entered himself of the Middle Temple in 1753, and in 1757 was called to the bar. He never practised; however, but having married in 1760, devoted himself to literature, and especially to genea-

logical and bibliographical studies. His earliest appearance in print was as a poet, a volume of 'Sonnets and other Poems' being published by him in 1785. Soon after the death of the last Duke of Chandos, in 1790, his uncontrolled imagination, excited perhaps by his somewhat unfortunate genealogical inquiries, a large share of vanity, and a passion for titles, led him to stimulate his elder brother the Rev. E. T. Brydges, to prefer a claim to the barony of Chandos, alleging his descent from the first Brydges or Bridges, who bore that title. Litigation was protracted till June, 1796, when the House of Lords decided that the petitioner had not made out his right to the title. Henceforth every thing which Sir Egerton Brydges wrote, was more or less a wall for the last traces of the dignity, and he continued to describe himself ' per legem Terrae Baron Chandos.' The worth-

lessness of his claim is amply shown in a Review of the Chandos Peergage Case, adjudicated in 1803, and of the pre-

tension of Sir S. E. Brydges, Bart., to designate himself per legem Terrae Baron Chandos. 'The case, of course, was the same, and there was the same sort of evidence adduced, and the same sort of arguments urged in support of the claim. A fine point was raised as to the "Person" of the parties. One of the most impressive passages in all law books is F. Belis, Esq., Lancaster Herald,' 8vo, 1831. By improvident expenditure in the purchase and improvement of the estate of Denton, Kent, Mr. Brydges had early become involved in his pecuniary circumstances, and in 1810 he removed to Lea Priory, the seat of his son, where he expired himself by self-
BRONIN

[Chemistry, X. 1.]

BRYOZOA, a name proposed by Ehrenberg for those Zoophytes in which a higher organization is indicated by the presence of separate orifices for the mouth and anus. The same naturalist has applied the term Anthozoa to those Polyzoa in which the mouth and vent have but one orifice. The families of Zoophytes of these two great families have been observed by Mr. J. V. Thompson, and previously to the publication of Ehrenberg's name, his designation for this family, Polyzoa, is more generally received. Other names have been given to this interesting family of Zoophytes. Professor Owen calls them Molluscous Zoophytes, on account of the structure of the animal being supposed to ally them to the Mollusca. For the reason they have also been called Ascidiod Polyzoa (P. Aestivida). Milne-Edwards has also called them Tunicated Polyzoa (Polyzoa tunicae).

Mr. J. V. Thompson, in his Travaux, vol. 3, p. 1837, proposes to call them Oladochesme, in reference to the ciliated character of their tentacles. Mr. Brak in his Catalogue of the Zoophytes in the Collection of the British Museum, gives the designation of Polyzoa as prior to that of any others. [POLYZOA.

BUCHE, LEOPOLD VON, a distinguished geologist, was born on the 25th April, 1774, at Solpe, in the Ueckermar (Brandenburg). He came of an ancient and noble family, which reckons among its members not a few authors and statesmen. After the usual course of education, he became a student in the Prussian department of mines, and was marked for the earnestness of his scientific pursuits. In 1790 he entered the Mining Academy at Freiberg, where he had Hrnmboldt for a companion, and where Werner, his eminent founder, taught the then novel science of mineralogy, in a way so interesting and genial, as thoroughly to enlist the sympathy of his pupils. Under his teachings grew up a school of young philosophers, destined to widen and confirm his reputation, and amend his errors, among whom Von Buch was one of the most conspicuous. In 1792 the publication of his 'Mineralogisches Beschreibung der Carlsbad Saline,' formed the first of that series of valuable papers with which he enriched his fame, and for the rest of his life—always distinguished as much by conscientious inference, as by perfection of observation. Next appeared his 'Versuch einer mineralogenischen Beschreibung von Landek,' describing in part the island of Slesvo, followed shortly afterwards by 'Versuch einer geognostischen Beschreibung von Schlesien,' with (for that time) a very advanced geognostical map of the country. These works are written in accordance with the views of his great master, in which the Neptunian theory prevailed; and it is no small proof of the accuracy of the observed facts that they are now easy to be reconciled with the present more enlightened theory.

In 1800 Von Buch and Humboldt met in Styria, and spent some time in geological excursions among the Alps, and passed the winter together in Salzburg in observation and verification of natural phenomena. In the following year Von Buch travelled alone, on foot, to Italy, and far-roving pursuits led him into several different parts of the countries he traversed, in which, besides the clearness of perception, there began to appear doxas as to whether the Wernerian doctrine were tenable in its integrity. He grew misanthropic of his former views. Writing from Rome to his friend Mr. Buck, he 'Made a great tour through the provinces of ancient Campania, visited the ruins of several cities, and then go a few miles farther on, and you will find occasion, upon grounds just as certain, to maintain the very opposite of your former conclusions.'

In 1802 he returned to Naples, and betaking himself to the study of Vesuvius, described the phenomena in that picturesque and eloquent style which among other qualities characterised his writings. In 1802 he visited the volcanic region of Avverganna. He revisited Italy, and was present at the eruption of Vesuvius in 1802. The results of these five years of observation were published in two volumes 'Geogenetischen Beobachtungen auf Reisen durch Deutschland und Italien,' 1802, in which, though reluctant to throw into the light the Wernerian conclusions, he 'But for a short while was entirely carried, to the estimation of water, and declares basalt to be a rock of volcanic origin.'

For the next two years, from 1806 to 1808, Von Buch travelled into Scandinavia, and made some of his most interesting geological discoveries. He observed the manner in which the fact of the slow and continuous upheaval of the Swedish coast above the sea-level; and he made valuable observations in climatology and the geography of plants, as may be seen in his narrative 'Reise durch Norwegen und Lappen,' 1806-1809, of which a translation was published with notes by Professor Jameson in 1813.

The more interest attaches to these journeys as they were performed on foot. Few who met Von Buch walking with unsteady gait, among grassy heaths between the naked craggy crest coat with numerous pockets to contain maps, specimens, his hammer and note-book, would have believed that he beheld whom Humboldt describes as 'the greatest geologist of our age; the first to recognise the true connection of volcanic phenomena and their mutual interdependence in regard to their effects and relations in space.' Possessed of sufficient means, Von Buch could gratify his inclination for travel, and for the encounter of others, especially youthful students, less fortunate than that he had himself been.

In 1815 he sailed from England (accompanied by the Norwegian botanist Christian Smith, who afterwards met with an untimely death in Tuckey's expedition to the Congo), and on the 15th September visited the island of Slesvo, and appeared the first geological map of Germany in forty sheets, of which Von Buch, though anonymous, was the compiler and author. He had visited the Basaltic islets of the Hebrides and the Giant's Causeway on his return from the Canaries, and in 1823 he published 'Physikalische Beschreibung kanger der Canariischen Inseln,' with an atlas, of which the unanswerable works, 'Ueber den Zusammenhang der basaltischen Inseln und Ueber Erhebungen-Krater,' and 'Ueber die Natur der vulkanischen Erscheinungen auf den Canarischen Inseln in ihre Verbindung mit andern Vulkanen der Erdorberflache' may be regarded as supplementary. These volcanic researches alone would suffice to establish his reputation. The science of volcanoes—the fruitful source of many later advances—is therein developed and placed on a sure basis. He shows how the phenomena of upheavals are traceable to craters of elevation, and demonstrates the action of fire; and states his conviction that 'the ancient seas have not rolled away over the mountain chains, but that the mountain have been raised up into a new atmosphere by bursting through the series of strata in long lines—fissures—and that these upheavals have taken place at different geological epochs.

Von Buch's life is strikingly manifest by his labours. His papers in the 'Abhandlungen' of the Berlin Academy of Science, would alone form several large volumes. They exhibit the development of his scientific views from first to last. In 1806 he had suggested certain ideas in his paper 'Ueber das Fortschreiten der Bildungen in der Erde, hauptlich zur der progress of forms in nature, and when past the age of
fifty, he showed how the ideas had ripened in his mind by his papers on the *Ammonites, Cephalaspides, Fossilia, Praecambriana*, *Orbitisten*, *Pro-
dactyli,* and others, accomplishing for the geological branch of paleontology what Carter had accomplished for the physiological branch. In the words of the late Edward Forbes, he was Von Buch "who first developed the idea of the oblongomor-
phosis of genera, the great leading principle of natural history applied to geology," he pointed the way moreover to a new field of research. Von Buch's noble work shows to be deductible from the serevation of the leaves of fossil plants. And in his writings on climate, on haul, the temperature of springs, and the geography of plants—guiding principles apparent in all—he proves himself an able physician was Von Buch.

In his many journeys Von Buch visited Sweden and Norway, and Auvrigne a second time, and any excuse sufficed to draw him to Switzerland. He would leave his house in Berlin without telling any of his intention, remain away for weeks or months, and return as unexpectedly. He liked to find out and make the acquaintance of geologists of emi-
nence, and for this purpose he attended the meetings of naturalists on the continent and of the British Association in Eng-
l
land. He was present at the Werner Festival, celebrated with so much pomp at Freiberg, in 1856. He never married, was somewhat eccentric in his habits, but always serious as regards science. When asked for his titles he was accus-
ted to reply, "Royal Prussian Student of Mines." He was created a baron, a knight of the Order of Merit (Berlin), and of the Red Eagle, and held the appointment of royal chamberlain in the court of Prussia. He was a member of the Academy of Sciences of Berlin, and of the chief scientific societies of the near and far East. In 1826, he was elected a foreign member of the Royal Society of London, and in 1840 was chosen one of the eight foreign associates of the French Academy of Sciences. He died at Berlin, after a few days’ illness, on the 4th of March, 1855.

"Von Buch was a swapper," says F. Forbes, in his anni-
versary address to the Geological Society. "He went about casting the seeds of new researches and fresh ideas, wherever his prophetic spirit perceived a soil adapted for their germination. The world was his garden, and his super-

natural and natural history departments of his science. In all these he has been an originator and a discoverer. In every subdivision of all three he has been a seeker—a high merit in itself."


BUCOLITZIE, a mineral closely allied to Silimanite. According to Thompson it is composed of—

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Polished of Manganese by (a specie) is.

It is found at Passa, in the Tyrol, and in several districts in the United States.

BUCIDA, a genus of plants belonging to the natural order

**Gymnosperms.** One of these species, *D. Bucida*, yields a bark which is used in medicine.

BUC. (Deer.)

BUCKINGHAM, JAMES SILK, was born in 1756, in the marine village of Flushing, near Falmouth, in Cornwall. His father was a sailor, and died while swimming. His mother sent him to school at Falmouth, and was desirous of bringing him up to the church, but he preferred going to sea, and made a few voyages to Lisbon, in the last of which the ship was captured and brought into a Spanish harbor by buccaneers. After some delay they were set at liberty, but on their way home were impressed for the British navy. Buck-

ingham however escaped the press-gang, returned to Cornwall, and entered into an engagement with a bookseller

at Devonport, in whose employ he remained about four years; and here he seems to have gained some knowledge of the trade of a printer. He however took to the sea again on board a king's ship, but deserted, returned home, and went to London, where, in 1789, he was apprenticed to a bookseller, and began to follow the trade. He afterwards was a bookseller in the Mediterranean trade, and made many friends at Malta and Smyrna. He then resolved to settle at Malta as a ship-owner and merchant, and having purchased a cargo of goods, sailed from London in April 1813. When the vessel reached Malta, the plague had broken out there, and no persons were allowed to land; the cargo however was taken on shore, and the ship then proceeded to Smyrna. While he remained at Smyrna, the many failures took place in Malta, and he among others lost all his property.

Buckingham then resolved to try his fortunes in Egypt, and left Smyrna for that purpose, August 30, 1813. He was well received at the British Embassy, and was introduced to the English ambassador, Sir John Conolly. He then met with the pasha, Mohammed Ali, who was then about on an expedition in Arabia. At this time there was much speculation about renewing the commerce with India through the Red Sea, and making a navigable canal from that sea to the Mediterranean. Buckingham had a desparch from Conolly, in which he offered his services to examine the Isthmus of Suez for an eligible track, and to trace as far as possible the course of the ancient canal. His offer, after some delay, was accepted, and he was sent out for the purpose. After several days as far as the cabarets, he started from Suez on the Nile; with the pasha attendant, for the purpose of travelling to Koseir on the Red Sea. His attendant deserted him on the route, he was robbed of everything he possessed, and was left entirely unaided. He was befriended by a poor Arab, and was able to make his way through the mountains, with some scanty covering, and at length reached Koseir, whence however he was obliged to return to Keneh, and thence to Cairo, without effecting anything. At Cairo he was introduced to the pasha, Mohammed Ali, with whom he had some long conversations, and having agreed upon the same terms as at Alexandria, as to the purchase of a vessel he had been able to purchase ships for him in India, and to encourage a trade between India and Egypt.

Mr. Buckingham then left Cairo for the purpose of pro-
ceeding to Bombay by the Red Sea, and reached Suez, October 16, 1814, and Bombay April 6, 1815, having been detained in Egypt. He found the merchants at Bombay distrustful of the pasha of Egypt, and unwilling to trade with him; he therefore accepted an engagement from the agent of the British Government at Muscat as commander of a ship of 1200 tons bur-
den, which was to trade with the East Indies. At Mus-cat, having agreed upon the same terms as before; he reached Suez, and traced the ancient canal as far as it had not been filled up and obliterated. After his return to Cairo the pasha had changed his mind as to the canal, but gave him a commission to purchase ships for him in India, and to encourage a trade between India and Egypt.

From this period his proceedings in the East are imperfectly known. In 1816 he was in Calcutta, and established a journal there, but the holdness of his censure of the mal-
administration of Indian affairs led to his expulsion from the

N 2
presidency of Bengal; his printing-presses were seized, and he was compelled to return to England. After a few weeks in London, Mr. Buckingham delivered many lectures against the monopoly of the East India Company, and in support of opening the trade to China. A liberal subscription was entered into to re-imburse him for the losses he had sustained by the suppression of his journal. He had been till then in the first rank among the contributors to the integrity and excellence of the Gentleman's Magazine, and had been the author of several periodical journals, and of 'The Athenaeum,' which is now the leading literary journal among those which are published weekly. In 1829 he published his 'Travels in Palestine'; in 1831 his 'Travels in Arabia; in 1832 his 'Travels in Tunisia;' in 1833 his 'Travels in Assyria and Media.' At a later period he made several tours through various parts of Europe and of North America. He published 2 vols. in Belgium, the Rhine, and Switzerland; and a fourth volume, which he published nearly three years in America, and traversed the United States in all directions, from Maine to Louisiana. His 'Travels' in America comprise,—3 vols. on the Northern States; 3 vols. on the Slave States; 3 vols. on the Eastern and Western States; and 1 vol. on Canada, Nova Scotia, and New Brunswick. Much of these volumes however consists of statistics, and a great variety of other matters of compilation. Their literary or other worth is very small.

In 1832 another Buckingham was elected member of parliament for Sheffield, and he retained his seat till 1835. He was a supporter of liberal policy, and especially of social reforms. For many years his chief occupation was the delivery of public lectures in various parts of the country. His character was one of high moral principle, and popular and pleasing, and his lectures were always fully attended. In 1843 he was the chief agent in establishing a literary club called the British and Foreign Institute, of which he was appointed secretary, but which ceased to exist in about three years. In 1840 he published 'Natural Evidences and Practical Remedies,' 1 vol., in which he expounded his views on many subjects connected with the public welfare. He was a zealous advocate of the temperance movement, and he was one of the signatories of the Temperance Declaration of 1851. In 1855 he published the first two volumes of his 'Autobiography,' and he intended to publish the next two volumes in the course of the same year, but he closed his life of extraordinary vicissitude and adventure on June 30, 1855.

The court of directors of the East India Company had made amends for their former ill-treatment by granting him a pension, which he enjoyed for a few of the last years of his life, and which is continued, we believe, to his widow, who is still living, having been his wife for fifty years. He was a fellow in the Royal Geographical Society, and was entered on the civil list. The manuscript journals of his various travels occupy, as he states in his 'Autobiography,' 28 folio volumes, closely written.

Buckland, THE VERY REV. WILLIAM, Dean of Westminster, an eminent geologist, was born at Axminster, Devon, in 1784. He was educated at St. Mary's College, Winchester, and from thence, in 1801, entered Corpus Christi College, Oxford, as scholar. In 1806 he was elected Fellow of this college. In 1815 he was appointed reader in mineralogy, and in 1818 reader in geology in Oxford University. His geological lectures were characterised by such clearness and comprehensiveness of description, and such apt illustration, that they met with brilliant success. Geology, as a science, was then in its infancy, and much of its subsequent vigorous advancement is due to Dr. Buckland's lectures.

The Geological Museum at Oxford owes its chief excellence to Dr. Buckland's industry in procuring and arranging specimens, particularly of the remains of the larger Fossil Mammals, and other animals from the caves in different parts of England and Germany. He spared neither pains nor expense in travelling to make the collection worthy of the university and the scientific world in general. He enriched it as exemplified in his 'Descriptive Notes,' with sections of 50 miles of the Irish coast, made jointly with the Rev. W. Conybeare, dean of Llandaff, during a tour in Ireland in 1813, and published the third volume of the 'Transactions of the Geological Society.'

In 1816 Dr. Buckland was elected a Fellow of the Royal Society. In 1820 he delivered a lecture before the university, which was afterwards published under the title 'Vindiciae Geologiae, or the Connexion of Geology with Religion explained.' The object of the lecture was to show that the study of geology has a tendency to confirm the evidences of natural religion, and that the facts developed by it are consistent with the best and purest traditions of the Creation and Deluge as recorded in the Mosaic writings.

In 1822 he communicated to the Royal Society an 'Account of an assemblage of Fossil Teeth and Bones of elephant, rhinoceros, hippopotamus, bear, tiger, hyena, and sixteen other animals of the Pleistocene epoch, discovered in a cave near Oxford.' Around the same period he published an account of a serpentine used to make the Copley medal, which in the same year the society awarded him the highest honour, the Copley medal. This paper was made the foundation of a treatise published in 1823 called 'Reliquiae Diluvii.' He was the author of the plan 'constituting the Action of an Universal Deluge,' which proved of essential service in the promotion of geological science.

In 1835 Dr. Buckland was made canon of Christ Church, Oxford. He was president of the British Association at his own instance, and on his bid, for the purpose of publishing his Bridgewater Treatise, 'Geology and Mineralogy considered with reference to Natural Theology,' 2 vols. 8vo. The discovery of new facts had materially advanced geological science, and in this work the previous diluvial theory, Dr. Buckland broke all the weight of his authority to support the views now generally received. One of the ablest of his numerous geological writings, as subsequently testified by Murchison and Sedgwick, was a sketch of the 'Elements of the geological sciences,' in which he showed, for the first time, that many crystalline rocks of this chain are of no higher antiquity than our Lias, Oolitic, and Cretaceous Formations.

The 'Transactions of the Geological Society' contain his 'Life of Dr. Buckland,' and his 'Lectures on the Geological Sciences.' Dr. Buckland's skill as a field geologist, as well as a paleontologist, and among them, his discovery of the south-western coal district of England (1825) may be mentioned as an example. It has stood the test of more than thirty years, and is still appealed to as a standard work.

Dr. Buckland was chosen on the council of the Royal Society in 1827, and in subsequent years up to 1849. He was one of the earliest fellows of the Geological Society, and he occupied the position of honorary secretary for some years.

His 'Lectures on the Geological Sciences' is a work that has been a monument of his science, and his 'Lectures on the History of the Earth' is a work of the same kind. His 'Lectures on the History of the Earth' was published in 1845, and contained a series of lectures on the history of the earth, which was delivered before the society in the years 1845 and 1846. The first volume of his 'Lectures on the History of the Earth' was published in 1845, and contained a series of lectures on the history of the earth, which was delivered before the society in the years 1845 and 1846.
bitter remarks made in the Chamber of Deputies by Dalong in reply to Bugeaud, in a debate on the conduct of Marshal Son and the Governor of Tangier that the government found it advisable on the occasion of Dalong's funeral to take precautions against an insurrection. A few months later Bugeaud's unpopularity was increased by the decisive measures he took for suppressing the various insurrections. He subdued Kabylie by destroying the inhabitant of the chief whose prowess and authority were really to be feared, to direct his whole strength against the disunited tribes, and reduce them successively to submission. Bugeaud returned to Paris to give an account of his mission. It soon appeared that Bugeaud knew better how to deal with the Arabs than the officers previously sent; and in 1840, affairs appearing very promising, Marshal Valles was recalled, and Bugeaud was appointed governor-general of the French possessions in Africa. An outline of his proceedings has been given under Algeria, S. I. It will be enough here to observe, that the maxims he was fond of repeating was that "to conquer the Arab you must first become an Arab," and that in accordance with this policy he organized the Zouaves and other irregular soldiers, characterized by their capacity for acting independently as well as in masses, their quickness of motion, and their daring, and who have since become so important a part of the French troops. In the forward establishments, a chain of fortified posts, he was enabled to maintain incessant attacks and surprises, never permitting any body of armed natives to collect without immediately dispersing them, and never allowing any hostile tribes to carry on any of their ordinary agricultural avocations. From his energy and ruthlessness, there was no escape for the uncivilized natives. Attacked in detail, resistance was useless; there was only the choice of submission or destruction. In three years Bugeaud was able to announce that there was no longer an enemy in the country. The Emperor of Morocco had ventured to oppose the progress of the French arms; but his coast-towns were ravaged, and at Isly, Bugeaud, with a far inferior force, had destroyed his army. For this last achievement Louis Philippe created Bugeaud Duke d'Isly; the Arabs gave him the more poetical title of Conqueror of Fortune. He returned to France in 1840; but in his absence Abd-el-Kader again collected an army, and, with the aid of the Timou and the latter's uncle, he went back, and with an iron hand quickly and effectively crushed the Arab rising. At the outbreak of the revolution of February 1848, Bugeaud was in Paris, and on the night of the 22nd the command of the troops was put into his hands. The government adopted energetic measures, but the king shrank from shedding blood, and the military command was placed in other hands. Bugeaud was not again employed till Louis Napoleon became president, when he was named to the command in chief of the army of the Alps. He was also elected by Charente-Inferieure representative in the National Assembly. But he enjoyed neither dignity long; he died of cholera, on the 10th of June, 1849. Bugeaud published memoirs on infantry manœuvres, on army organization, on the establishment of military colonies, and on a variety of matters connected with the government of Algeria.

BULGARIA, a country in Europe, is bounded N. by the Danube, which separates it from the principalities of Wallachia and Moldavia; E. by the province of Be-sarabia; S. by the crest of the Black Sea; and W. by the principalities of Servia, from which it is partially divided by the Timok, a feeder of the Danube. The area is about 23,000 square miles, and the population according to the census of 1844 was about 3,000,000, the majority of whom are adherents of the Greek Church. The Danube river flows along the province for not less than 400 miles, and is navigable for steamers and large vessels all the way. It forms numerous small islands in its course and a delta at its mouth; and on both sides of the river at intervals are extensive marshes, which in the dry season are very unhealthy and infested by mosquitoes.

The Balkan Mountains, the ancient Hyamus, rise on the southern frontier of Bulgaria, and extend down rapidly on the south side; on the north the slope is more gradual. The chain is traversed by many defiles and passes. From its crest numerous ramifications extend northward to the plain of the Danube. These branches are generally well wooded and covered with thick heaths, and they are separated by valleys or small plains drained by feeders of the Danube. The principal of these rivers, commencing on the Servian frontier and proceeding eastward, the Skadar, the Samara, and the Struma, tributary to the Danube, descend through the passes of the Balkans, and enter the Black Sea between Cape Eminush and the port of Varna. The snows that screen the valley of the Kamchi is on the north is the town and fortress of Shumla. The most important of the other tributaries of the Black Sea in Sisilia is the Para-wadi, which passes through the marshy lake of Devno and falls into the port of Varna. The Para-wadi River is identified by General Jochmus in his Notes of a Journey to the Balkan with the ancient Lyginc; and the site of Alexander's battle with the Triballii (a.d. 336) he considers to be the isthmus between the two lakes of Devno, a little west of the village Buyak-Aladin. Not far from the same spot, but nearer Varna, is the site of the great battle fought between the Sultan Murad and King Wladislaus in 1444. The site is usually identified by two large mounds called Sandashak Tepé and Marad Tepé.
The beautiful Emineh of Bulgaria. Kamentsch,1 colomn, is inhabited abundantly. Barley also of fine quality is extensively grown.

The eastern part of the pashalic of Nicopolis is well wooded as far as the neighbourhood of Kustench; it also possesses abundant pastureage, and, in ordinary years, when not visited by long droughts, it is very productive in corn. Wood for building purposes is abundant in the forests of Despoto-Dagh. Between Kustench and Sistova the plain of the Danube is occupied densely and solely by Bulgarians, and presents a fertile and pleasing aspect. Besides corn, the chief products are hemp, flax, sitar of roses, and tallow. Sistova is considered the capital of the Bulgarians; it is one of the most important towns on the right bank of the Danube, and carries on a considerable trade with Wallachia. Westward from Nicopolis, and throughout the greater part of the pashalic of Wallachia, the cultivation is for the most part confined to a few points, being met with only where there is water, and agricultural produce is raised merely sufficient for the local consumption. The plain of the Danube here partakes of the nature of a steppe, and cultivation prevails more in the mountainsous districts of the north than in the plains. It was long effectually checked in this part of Bulgaria by a restrictive system, by which the farmers could not sell their surplus produce without the pasha's permission, and at a price fixed by him. In 1837, however, by a law passed in Constantinople, these regulations have been very injurious to the trade of Widdin, which, however, has a considerable commerce in manufactured goods imported from Austria.

The tallow trade causes the rearing of large numbers of cattle in Bulgaria. Large herds of oxen, to the number of 40,000 or more, are fattened during the summer months, and slaughtered during the autumn, in the neighbourhood of Varna, Sistova, Kustench, and other towns, for their hides and fat; for beef is seldom eaten by the Moesians, whose favourite animal food is mutton and goat. There is a depot at Varna for the tallow and other products of the province. Owing to the difficulties, tediousness, and expense of clearing the spruce forests, the corn-growing countries are short of timber. The jealous regulations, the corn and other products of Bulgaria are generally brought by land carriage to Varna for export even from the plain of the Danube. Corn, however, for export to Constanti
tenople, is generally conveyed in small vessels, of from 30 to 100 tons, which are very numerous on the river, to Matzin, a small port opposite Braiboff, and thence embarked in larger vessels. From the roadstead of Kustench also large quantifies of corn are occasionally exported; but the exposed condition of this port since the destruction of its mole (built by Constantine the Great) is a great obstacle to its trade. Its position, however, has been at all times considered of great importance, as it is only 30 miles distant from Gornaow on the Danube. A canal was projected in 1857 to unite the two points, and to give a short and direct route to the Danube trade, by avoiding the great northern bend of that river, and the intricate shoals and mud-banks in its month. This project has been recently revived, and will probably be one day executed.

Besides horned cattle, including buffaloes, Bulgaria rears a great many horses of inferior breed, sheep and goats in great numbers, and swine for the consumption of the Christian part of the population: pork to the Moesian, as to the Jew an abomination. The characteristics of the products are all of a coarse description, and for home consumption. The imports are manufactured goods, coffee, spices, sugar, salt, &c.

The principal towns of Bulgaria are—Widdin, Nicopolis, Sistova, Kustench, Silistria, Russovo, Tarnovo, Sophia, Varna, Kustench, Shumla, Nissa, &c., of which the most important are described under their respective names.

Bulgaria comprises the greater part of ancient Muscovia, which was possessed in the time of Darius by the Getae, and in the time of Alexander by the Triball. It is a very i-
wresting country for its historical associations, to illustrate which there is great need of enlightened exploration. General Camouflet, in the already quoted, has thrown great light upon the early history of the town and the campaigns of Alexander in this country. He supposes Damas to have crossed the Balkan by the pass to the north-west of Mesembria, and to have marched northward to Isatacha by the same route. It was Sir James规划, supporter of the Corn Laws, advocated triennial parliaments, was agan

st property qualification for members of the House of Commons, maintained the necessity of national education, and was a strong advocate of the Roman Empire. He early distinguished himself by his speeches on colonisation, and by the ability with which he advocated improved principles and practice in colonial government. When the Earl of Durham was sent out in 1856 as governor-general of Canada, he advised Mr. Bulwer that he had contributed largely to the Report which was presented to parliament by the Earl of Durham, and published in 1859. After his return from Canada, Mr. Bulwer commenced the practice of the law, in appeals from the colonies and from Hindostan to the Privy Council. In 1841 Lord Melbourne appointed him secretary of the Board of Control; and Lord John Russell, after he became premier in 1846, made him Judge-Advocate General, with an understanding, as is said (which he was not realised), that he was to take in some way as colonial minister, though not included in the department. In November 1846 he was appointed a queen's counsellor, and in July 1847 was sworn of the Privy Council. Upon the re

turn of Lord Melbourne in 1848, Mr. Bulwer was made as head of the board, he was appointed to that office in Nov. 1847. He died in London, Nov. 26, 1848.

Mr. Bulwer was a ready extemporaneous speaker, but was accustomed to be excused for only making up his speeches in their whole extent. He also wrote for the periodical press, especially the 'Morning Chronicle' and 'The Globe,' and for the 'Edinburgh Review' and 'Westminster Review.' He also wrote for the 'Colonial Magazine' a series of papers on 'Responsible Government for Colonies,' afterwards published as a small volume.

Bumella, a genus of plants belonging to the natural order Sapotoceae. Many of the species are used in medi

cine. B. myra has a bitter and astringent bark, which is used in China for the treatment of fever and cholera, and is sold in Europe under the name of 'chinsa.' The fruit of B. cycosidis is astringent, with some of a bilious nature, but is of a mild and milky fruit. The fruit of B. cycosidis is astringent, with some sweetness, and is said to be useful in diarrhoea. The flowers of B. gracilecula have a heavy unpleasant odour. (Linley, Vegetable Kingdom.)

Burton, Miss. [D'ARBLAY, Madame, S.1.]

Burns Island, Fileyshire, Scotland, a town, royal burgh, and sea-port, in the parish of Burntisland, on the north or left side of the Firth of Forth, is situated in 56° 4' N. lat., 3° 13' W., long, about 5 miles nearly due north from Leith. The population of the royal burgh in 1851 was 2329, of the parochial burgh 2724. The burgh is governed by a burgh council, of whom one is provost; and united with Kirkaldy, Dysart, and Kinghorn, in returning one member to the Imperial Parliament. Burntisland was made a royal burgh in 1568. At the General Assembly which met here in 1601 James VI. took the oath to the Covenant. The town was fortified in the reign of Charles I., and besieged and taken by Cromwell, who repaired and considerably improved the harbour. The town chiefly consists of two parallel streets terminated by the harbour on the east. The harbour is deep and well sheltered. Between the two streets is an area of about 65 acres, which was partly filled up in the latter end of the 17th century. In the year 1676 a new road was opened from the town to the sea. The harbour is about 540 yards long by 150 wide. The town of Burntisland is for the most part built of stone, and is very neatly built. There is a good dry dock; and on the western pier is a lighthouse, the light of which may be seen a distance of seven miles. Burntisland formerly possessed a considerable trade. About 1656 there were twelve ports, including St. Andrews and the new extensive
port of Kirkaldy, which were subordinate to Bertrieland.

For many years past its traffic has been confined to that arising from the curing of herrings and from distilleries in the neighbourhood. Ship-building is carried on. There is daily steam communication with Granton on the opposite coast, and the Edinburgh and Northern railway opens up a direct communication with the whole north-east of Scotland, the passage across the Firth being effected here by a floating railroad.

The parish church was built in 1832. There are also a Free church, and chapels for Episcopalians and United Presbyterians.

North from the town, on the summit of Dunearn Hill, an eminence rising 696 feet above the sea, is a level space surrounded with a number of loose stones, which has been called Agricola’s Camp, and supposed, very improbably, to mark the site of a Roman encampment. On another eminence overhanging the harbour stands Rossend Castle, erected about the 18th century.

BUTE, one of the islands which compose the county of Bute, Scotland, is situated in the Firth of Clyde, between 55° 46' and 55° 50' N. lat., 4° 56' and 6° 10' W. long., distant about six miles from the opposite mainland of Ayrshire, and about half a mile from Argyleshire, from which county it is separated by a narrow and crooked but picturesque channel called the Kailes of Bute. The population of the island in 1851 was 10,681. The island is about 16 miles long, and varies from three miles to four miles in breadth. To the north it is elevated, rocky, and baren; the central part is diversified by bays, valleys, and fertile tracts; and the south end is hilly and divid’d from the rest of the island by a low and sandy plain called Langel-chord. The coast is rocky and indented by bays. The soil of the island consists of clay, loam, and sand, with moss lying on gravel. The greater part of the arable land is inclosed and cultivated, barley, oats, potatoes, turnips, and the artificial grasses are all cultivated with success. About the middle of the island are three small lakes—Loch Fad, Loch Aesog, and Loch Qtin. The climate though damp, is mild and temperate, and the island is much resorted to by invalids, Rothsay being one of the favourite watering-places of the Clyde. The minerals are limestone, freestone, slate, and some indifferently coal. Beds of coral and shells, of considerable thickness, are found in several places half a mile from the sea-coast.

Bute island contains many remains of antiquity. Dungie, or Dunagollan, a vitrified fort, attributed to the Danes or Norwegians, and situated on a lofty crag, is the south-west part of the island, is an object of interest and curiosity. In the southern extremity of the island are the ruins of an ancient chapel. Not far from the ruins are the remains of a circular erection about 30 feet in diameter and 10 feet high, known as the Devil’s Cauldron; the object for which it was erected has not been ascertained. Bute, and the adjacent islands, were long subject to the Norwegians. Haro of Norway in 1263 took possession of Bute, but after his defeat it returned to the allegiance of the King of Scotland.

Edward of England held it till 1312, when it fell into the possession of Bruce. Robert III. and James III. made the island their occasional residence. It was garrisoned by Cromwell, and was the scene of the Earl of Argyle’s unfortunate landing in 1665.

(NEw Statistical Account of Scotland.)

The Bute, a genus of Birds belonging to the order Raptura and the family Falconidae. It includes, according to Yarrell, two British species, B. vulgaris, the Common Buzzard, and B. lapponus, the Rough-Legged Buzzard. [FALCONIDAe] Various other species of the Falconidae have been included under this generic name. (Yarrell, British Birds.)

BUTYRONE. [Chemistry. S. 2.]

BUTYRYLE. [Chemistry. S. 2.]

BYRSONIMA, a genus of plants belonging to the natural order Malpighiaceae. The bark of the species is astringent, and is used extensively for tanning the hide. The wood of some of the species, especially B. berberisfolia, is of a bright red. The bark of B. cassiafolia is used in fevers. B. cassiafolia is one of the thousand remedies for rattlesnake bites. It is called Chapera Mancha. The Almococo Bark is the produce of B. lasiosepala, B. hophaliafolia, and B. coccoloba folia. The acid and astringent berries of B. speciosa are said to be good in dysentery. (Lindley, Vegetable Kingdom.)

BYTOWN, Canada West, the chief town of Carleton County, is situated in a very beautiful part of the country on the Ottawa, near the junction of the Rideau Canal with that river, in 45° 29' N. lat., 76° 15' W. long.; distant 128 miles N.E. from Kingston, and 284 miles N.E. by E. from Toronto: the population of the town in 1851 was 7720. The lower town, which is the older part, is that in which business is generally carried on: the upper town is of more recent erection; it is situated about half a mile distant on a more elevated site, and consists chiefly of private residences. Considerable improvement has taken place in the appearance of Bytown of late years. Several handsome stone buildings have been erected. The town contains places of worship for Episcopalians, Presbyterians, Wesleyan Methodists, Baptists, and Roman Catholics; several schools, a commercial reading-room, a mercantile library association, a court-house, barracks, and a jail. Bytown is supported chiefly by the lumber trade, a term applied to the system of floating large rafts of rough timber down the rivers of America to the depots and ports in the lower parts of their course. Timber cut on crown-lands and brought down the Ottawa River is measured at Bytown, and the owner gives bond to pay the duties at Quebec. The value of timber brought down the river in one year, 1844, was estimated at 341,750$. About three-fifths of the whole being cut on crown-lands was liable to duty, amounting to about 24,000$. Pairs are held at Bytown in April and September. Steamers ply between Bytown and Grenville on the Ottawa, and between Bytown and Kingston on the Rideau Canal.
CA-belot. [Whal.,
CACO.DY. [CHEMISTRY, S. 1.]
CADDICE, CADDIS-WORM, or CAD-BAIT, the com-
non name for the larvae of the species _Ptygomea_, which
reside in the water, in cases which the form of various sub-
stances, such as _live_ of stick, grains of sand, small stones,
&c., which are held together by a silken thread secreted
in their bodies in the same manner as in the silk-worm.
The case acts as a protection to the larva, and it is capable of
drying out its head or putting it out, according to circum-
cstances.
CADET, LIQUOR OF. [Cychol. In CHEMISTRY, S. 1.]
CAHUR. [Tippenergy.
CAPTOR.
CALAMOPHILUS, a genus of Birds belonging to the
family _Paridae_ and the tribe _Incanceses_, sub-tribe _Dentroastes.
C. biarmicus_ of Yarrell is the _Porus biarmicus_ of Pennant
and other writers. This bird is common in Great Britain,
and is known by the name of the Bearded Tit. (Ttywinsk.)
(Tatelwill. _British Birds._
CALEDONIAN CANAL, a connected series of lakes and
canal extending through Glenmore, or the 'Great Glen of
Alien', a-straight line from the Western Ocean with the North
sea, a distance of 40 miles. Various canal companies were
formed for the purposes of extending the above line of
work, which afterwards failed, and the company was
founded by a charter granted in 1790, with capital of £1,000,000.
The canal commenced in 1803, and was completed in 1823.
Telford's work was of a uniform width, 26 feet 4 inches
wide, and 8 feet 6 inches deep. The canal was designed
for a lock-replica at the open end, and for four locks
altogether at the lock-gate end. The lock-gate lock was
80 feet long, and the lock in the middle of the canal
120 feet long. The canal was opened on the 11th of March
1823.
CAPE DIAMOND. On the coast of Madagascar, five
miles N.W. of the peninsula of Cape St. Marie, an island
is supposed to be the source of the diamond. The
island is inhabited by a savage tribe of negroes, who are
assuredly the owners of the diamonds. The island
is about 16 miles long and 12 miles wide. It is
supposed that the diamonds are melted down at
various places along the coast, and that they are
collectively called 'Cape Diamond.'
CAPE YORK. The name given to the western
extremity of the island of New Holland.
CAPTAIN. A Caledonian Canal commences on the south-
west end of the shore of Loch Eil near Fort William, in
56° 00'. N. lat., and 5° 12'. W. long., and joins Loch Lomond by
cutting a mile in length; a short cutting of about 2 miles
through Loch Lomond, with Loch Oich; a canal nearly 6 miles
long, from the north-east end of Loch Ness; and a canal of about
7 miles in length continues the passage to Criancharn near Inverness;
whence by another short artificial cutting, it goes into the Moray Firth on the shore of Lochs Heavenly,
in 57° 45'. N. lat., 4° 15'. W. long. The length of this
communication divided by the west and east seas is in all about
60 miles, of which rather more than 37 miles are through
natural lochs or lakes, and about 23 miles through artificial
cuttings. The summit level at Loch Oich, which is about
94 feet above high water on the east coast at spring tide,
there are 36 lochs, in the 14, 16, to the west of Loch Och, and 14 to the east. The locks are about 170 feet in
length and 40 feet in width, the rise of each lock being 8 feet.
The width of the canal at water surface is 120 feet; at the
bottom 50 feet; the depth of water is 17 feet. There were
considerable difficulties to be overcome in the
construction of the canal. The object propounded in this
rational work was the avoidance of the tedious and often
dangerous voyage of the Orkneys and Cape Wrath. From
Kintraid's Head on the east coast to the Sound of Mull on the
west coast the passage by the Orkneys and Cape Wrath is
about 600 miles, while by the inland navigation the
distance is only 254 miles. By the Cape Wrath passage
many shipwrecks had occurred. A large amount of public
money has been expended on the works. The returns have
been very small in comparison with the cost; one chief
cause of the failure was the indolent conduct of the
agents of the legislature in imposing duties on the importation of timber
from the Baltic, in order to encourage the employment in this
country of timber of Canadian growth. For a number of
years after the opening of the canal vessels were
considered as the means of moving transportation and contrary winds; since
1847 this has been remedied by the establishment of steami-
vessels, causing a considerable increase in the number of
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 republicain, he was yet eminently conservative in spirit, a staunch defender of all southern rights, and the inflexible supporter of the 'institution' of slavery. In general and international politics, he commonly took the popular, or, as it is usually termed, the patriotic side. He died March 31, 1850. Many of Mr. Calhoun's speeches were printed as separate publications about the time of their delivery; and his collected 'Works' are now in course of publication at Charleston and Columbia.

Of the small number of birds belonging to the order Grallatcric and the family Charadriidea. It has the following characters:—Beak as long as the head, straight, slender, flexible, compressed at the base, with the point dilated and smooth; nostrils basal, lateral, narrow, long-twigged; primary feathers short, forming a smooth point of the beak; wings of moderate length, pointed, the first quill-feather the longest; legs of medium length, naked above the tarsal joint; feet with three toes, all directed forwards, with a very small connecting membrane at their base. Gould, in his 'Birds of Europe,' regards the knot (Tringa canutus) as a species of Calidris. With this exception, the only British bird which is a species of this genus is C. arenaria, the Sandpiper. It is an inhabitant of most of the shores of Great Britain and Ireland. It obtains its food by probing the moist sands of the sea-shores, from which it obtains minute molluscous, shrimps, annelids, &c. It visits the shores of Sweden, and is stated to breed still farther north. John Richardson says it breeds on the coasts of Hudson's Bay, but it does not appear to breed in the British Islands. (Yarel, Brit. Birds.)

CALIFORNIA, STATE OF, one of the United States of North America, is bounded N. by the United States territory of Utah, S. by the State of Texas, and E. by the Mexican territory of Lower California. Its western boundary is the Pacific Ocean, along which it extends from 32° to 49° N. lat., its eastern boundary is defined by a line which runs along 120° W. long. from 42° to 55° N. lat., thence in a south-westerly direction which intersects the Rio Colorado in 35° N. lat., whence it is continued down the mid-channel of that river to its mouth in the Gulf of California, 33° N. lat. The area is 180,000 square miles, or 187,263,600 acres. It contains 507,067. The tract of country which now forms the State of California was, until lately, the coast section of the territory of Upper (Alta) or New (Nueva) California, the north-western part of the Mexican republic. It was ceded to the United States of North America by treaty in February 1848, and has since been admitted into the Union as a sovereign state. The extraordinary increase of its population will be seen by the following statement:—In 1862, Humboldt, a monk, who had applied at the head of the missions, estimated the whole population of California, which included, besides the present State of California, the territory of Utah and (in part) that of New Mexico, at 18,682, of whom 15,652 were 'converted Indians.' The official statement of the resident in California in 1829 was 20,105, of whom 18,783 were converted Indians. After the suppression of the missions the Indians became more scattered, and no official statement of the population was made. The first federal census after the cession of California to the United States was in 1850, when the State of California had a total population of 117,583. In 1862 a census was taken by the State authorities, when the agents' report gave the population as 264,435; but the Secretary of the Interior of the United States, in his report to Congress, states that these agents declare their inability to obtain the numbers of 'the whole population of their respective counties,' and he thinks it necessary, in order to render an approximately correct statement, to add one-sixth to the number returned. He therefore gives 306,607 as the population in 1850, of whom 210,858 were whites, little more than 30,000 being females, and 105,344 being citizens over 21 years of age; 4200 were negroes, of whom the females were under 300; 573 were Indians; 270 were domestic servants; and 250 foreign residents, of whom about 25,000 were Chinese. California sent in 1857 two members to the Congress of the United States, and like each of the other states two members to the Senate.

Coast-line, Surface, Hydrography.—The State of California owes its characteristic features to two great ranges of mountains, the Sierra Nevada and the Coast Range, which traverse it from north-west to south-east, having between them the splendid valley of the Sacramento and the Jozquin; on the eastern side wide sandy plains, and on the west a narrow slip of coast. The coast of California is generally rugged and precipices. Beginning at its southern extremity, it makes a bold semi-circular sweep to the north-west as far as Point Conception. Of this part of the coast there are several small islands and rocks, and the coast-line is indented by several bays and harbours. The only valuable one of these is San Diego Bay (33° 41' N. lat.), which has an excellent natural breakwater at its mouth, formed by a narrow strip of sand which extends from the projecting lands, is wide and spacious, and forms an excellent, though at present little-used, harbour. The harbours of San Pedro and Santa Barbara are also available for craft of considerable burden. From Conception Point to Point Arena, the northernmost point of the southern extremity of Monterey Bay, one of the safest and most capacious harbours on this coast; it is said to be capable of containing at one time the navies of the world. From Monterey Bay the coast continues as before for about 70 miles, in a direct line to the almost untravalled bay of San Francisco. The entrance, which is nearly in the centre of San Francisco Bay, is only about a mile wide, but the bay itself opens out for more than 80 miles both on the right and left; its entire length is 70 miles, with an average breadth of 8 miles, and it has a coast of 276 miles. By projecting points of land, several small inner bays are formed, the principal being San Pablo and Suisun bays. It is land-locked on every side, and quite safe within, but a bar at the mouth renders it dangerous for large vessels. The natural outlet of the valleys of Sacramento and Jozquin, with their wondrous mineral riches and vast agricultural capabilities. Beyond San Francisco Bay is Port Bodega, where was formerly a Russian station. A little further north, the roads divide, but less broken than before, to Point Delgado, beyond which is the bold headland of Cape Mendocino, 40° 21' N. lat., which forms the southern point of the bay of Trinidad, in which the coast of California terminates. The mountain masses of Lower California extend undivided into the State of California as far north as the snow-capped peak of St. Bernardino, 34° N. lat., where they divide into the two great ranges already mentioned. From St. Bernardino, the mountain ranges are generally parallel direction. The eastern range, called the Sierra Nevada, or Snowy Range, is by far the loftiest, of its peaks being above the line of perpetual snow: the Saddle Peak is 7500 feet high, the Table Mountain 8000 feet, the Butte 9000 feet, and Mount Shasta at the northern extremity of the range (41° 34' N. lat.) 14,500 feet above the sea. This range is traversed by few and those very elevated passes. North of 39° N. lat. its slopes, especially on the western side, have vast forests of pines and firs. The Sierra Nevada from the coast averages about 200 miles. The Coast Range runs at a short distance only from the coast, to which it is generally nearly parallel. Its usual height varies from 3000 to 5000 feet, and it extends as far south as the head of San Francisco Bay, is 9700 feet above the sea. This range is broken near Monte Diavolo by the united Sacramento and Jozquin rivers; decreases in altitude towards the north; and finally re-unites with the Sierra Nevada near Mount Shasta. From this point northward the surface of the country is wholly mountainous and little known; the Sierra Nevada with its offsets and connected ranges occupying the entire breadth of northern California, and extending north-westwards at last to the coast of Oregon. The Sierra Nevada, being the highest of the mountains of the Sierra Nevada and the great valley is a line of lower mountains; and from both the Sierra Nevada and the Coast Range lesser lateral ranges and offsets diverge throughout California, forming numerous narrow valleys and ravines.

The basin included between the two main ranges, though only one geographical formation, bears the name of the Sacramento and Jozquin valleys, from the rivers which rise in them, and empty into the Pacific Ocean. The upper part of the rivers is very turbulent, and they empty into San Francisco Bay. This fine valley is upwards of 500 miles long and 40 miles wide. It has evidently at some remote period been the bed of a vast lake of which the Sierra Nevada and Coast Range are the residual cabins. The southerly direction which it has probably been drained by some convulsion of nature having broken a passage through the Coast Range at San Francisco Bay. At the southern extremity of the valley are the Tulare (Borivali) Lakes, which during the wet season extend above 100 miles.
CAL in length, but in the dry season have little water, and are fordable in many places. Within the last year or two a commencement has been made towards embanking these channels by means of faggots of flag-hillocks. Dugouts to the annual floods. The soil and climate of this great valley vary considerably, but a large part of it is very fertile, including most of the eastern side, which is intersected by numerous streams. Along which the land is extremely rich and fertile. The coast is of fine profile, with the gambling deserts, used, being broken into rugged hills at its northern end, and in many places along its eastern side by well-wooded spurs from the Sierra Nevada. Towards its southern end by the Tulare Lakes, and along the banks of the two great rivers, it is dotted with beautiful backwater tracts and oxbows, formed in undulating slopes, which break into low hills as they approach the bases of the mountains. The richest and most picturesque part of this fine valley is that central portion of it which incloses San Francisco Bay and the delta of the Sacramento.

The coast district west of the Coast Range—almost the only part of California inhabited previous to the American occupation, but now by us means the most populous part of the country—is of narrow coastal valleys, the seats in former days of the mission stations, around which the industry of their occupants had caused most of the cereals and fruits of temperate climes to flourish abundantly. Along a good part of the coast the mountains come close down to the sea; but above and inland, the country rises gradually, and even very high, yet retaining mainly to the superior attractiveness of the mountains and great valleys, and partly to its being occupied by hostile tribes of Indians. It is believed that while much of it is of comparatively small account, there are very extensive regions of fine and hitherto unappreciated land. The country along the Colorado is supposed to have a rich alluvial soil; but near its entrance into the California Gulf the country about it is dry and barren, and the climate extremely hot.

The most important rivers of California are the Sacramento and the San Joaquin: the value of the Colorado remains to be fully ascertained. The Sacramento rises at the northern extremity of the valley of the same name; its head-streams issuing chiefly from Mount Shasta or Kame of its spurs. Its course throughout is a broad and level, and it receives on its left bank a great number of affluents from the Sierra Nevada. Most of these are mere mountain torrents; but several of them, as the Feather, the American, Cosumnes, and the San Joaquin, have been converted into fine and fertile districts. The Sacramento receives the San Joaquin, and the United river turns abruptly to the west, and soon after expanding to a considerable width opens into San Francisco Bay. The entire length of the Sacramento is about 900 miles; its width at the San Joaquin junction is 10 miles; at its middle distance from 290 to 300 yards, and it is navigable at all seasons up to Sacramento city, 150 miles from its mouth. The Sacramento is subject to great floods during the wet season, and on the melting of the snow on the Sierra Nevada. The San Joaquin issues from the Tulare Lakes at the southern end of the great valley. Its course is north and north-east, and like the Sacramento it receives numerous tributaries from the Sierra Nevada. During the wet season the San Joaquin is greatly augmented in its course, and since 1850 has overflowed its borders. It is navigable for vessels drawing 3 feet of water up to Stockton, 3 miles above its junction with the Sacramento, and for vessels under 15 tons up to the Tulare river. The San Joaquin abounds in fine fish, and the taking and curing of salmon afford employment to many persons. The banks of the river and its tributaries are generally extremely fertile, and agriculture is pursued with much diligence. The country watered by the San Joaquin and its affluents is becoming rapidly inhabited, and the value of its land, even in the districts which drain the south-eastern portion of California, and which falls into the Gulf of California, belongs rather to New Mexico, under which it is noticed. Except during the wet season, this river, though draining a vast extent of country, is very sluggish, and few boats can pass for 15 miles without being drawn. The total quantity shipped in 1853 from San Francisco during 1852 was 46,526,574 barrels; but this does not show the entire amount exported, as large quantities are taken abroad in small vessels without being entered. If 10 millions of barrels had been added to this the total quantity shipped in 1853 from San Francisco would be about 65 millions of dollars. The quantity received at the mint of the United States in 1852 was 136,747,935 dollars. Since that date an Act of Congress has been passed for establishing a mint in California. The total shipments of gold from San Francisco from April 11, 1849, to Dec. 31, 1856, inclusive, were valued at 322,399,836 dollars.

What is known as the Gold Region of California extends for some 500 miles in length, with a breadth of from 40 to 50 miles, following the range of the Sierra Nevada. It occupies the lower mountains of that range lying between the
central mountains and the valley of the Sacramento and the
San Joaquin. These mountains range from 4,000 to 6,000
feet above the sea and give rise to the numerous
gulleys and ravins, or in the sandy beds of the mountain
streams on their way towards the two great rivers.
The geological formation of this region is very similar to
that of the gold mountains of Australia and the Ural Mountains of
Russia. (A. L.) Whether this gold has been found in situ it has been
in connection with quartz; and the water-worn gold found in the
dehis of the rocks and the sands of the rivers in like manner shows, by its
frequently being enclosed to small particles of quartz, that it was
once in the sands of the rivers. The main region, as we
have said, is the low-r mountains on the west side of the
Sierra Nevada, but gold has been also found in the lofty
central heights of the Sierra Nevada, and on its eastern side. It is
reported that gold has been found in the Coast Range, especially in the
narrow valleys on its western side, and also in the connected ranges.
Indeed Drake's words seem now singularly applicable; for there appears
to be hardly any "part of this country where there is not special
likelihood of gold."

Nor is gold the only important metal which abounds,
though it is the only one to which much attention is at present
given. A mine of quicksilver has long been worked in the
region of San Francisco Bay, and grows frequently to a depth of 240 feet
below the surface and is easily procured. But the metal is believed also to be widely spread
and in valuable veins in other parts of the state. Silver ore of
great richness has been found at Monterey and elsewhere. Copious
springs of the mineral in the mountains are also believed to abound.
Coal is profitably worked at San Francisco, and is supposed to exist in extensive beds in other parts.

Botany and Zoology—The botany of California is of a
peculiar and interesting character. It contains among other
striking plants some noble pines, especially one called from
its discoverer, the Douglas pine (Pinus Douglasii), which occurs on the mountains about San Francisco Bay, and grows frequently to the height of 240 feet
above the sea. It is usually found at an elevation of 60 feet.
This tree is the oak of the Indians. The P. Sabinius, P. Lambertina, and P.
Nobla are of less magnificent but still very large dimensions,
and great beauty. The live oak (Quercus virginia) grows to a
considerable size on the lower hills of the west side of the
Sierra Nevada, and on it Fremont found annually large quantities of
mistletoe. The white oak is common in the valleys. The
maple, ash, beech, and chestnut are the other more usual
dean woods of the forest. There are forests which greatly extend south of 39° N. lat. Two or three kinds of
Arbutus abound on the hanks of the rivers and the margins of the
forests. The Scilla exelsa grows everywhere along the
coast; its root is the squash of the Indians, with which they make tables of foreign kinds. The
Helonias tenax are made by the natives into a very tough
cord for snaring deer, &c.; and the olives and sassafras are used by them for coap. Large numbers of Pokemoniaceae,
especially some beautiful specimens of the Lepisophora
and Glis; some curious plants belonging to the genera Nema-
phila and Emmenentha; several new genera of poppies,
Bachettia, lupines, Calochortus, Cyclobothrs, Callicipra,
Brodonia, &c., stamp the vegetation with a character quite
unlike that of any other part of America.

The black bear, theizzly bear, and the barren-ground
bear, the raccoon, American badger, gopher, ermine, wessel,
mink, martins, and skunk are common in many parts; as are also
the beaver and the musk-rat about the mouth of the
Sacramento; all of these are much sought after for their
skins. Several kinds of wolves, foxes, and lynxes abound in the
dense forests of the north, where they prey on the
umerous deer and other animals which frequent those
regions. Of the birds, that which is the most important, and the
tall-tailed or jumping deer, the elk, and the great antelope (A. jucifer)
are the most plentiful. Mountain sheep abound. The bison is only occasionally met with.

Among birds the first place is due to the great Californian
duck. This species is found in California in abundance
only to the South American condor in size, and very similar
to it in its h habits. The black vulture, the turkey buzzard,
the golden eagle, the badger, the p-reigning falcon, the
jaguar, the coy, and several other hawks and connected
species as well as owls, are more or less common. Most of
the ordinary European singing birds, swallows, woodpeckers,
&c., or birds to which similar names have been given,
are also abundant. The humming-bird is common in the south. Grasshoppers and the fire-fly are in abundance in
this kind—than have been found in any other country. The bays
and inlets of the coast swarm with swans, geese, ducks,
curlews, and most of the other ordinary wading and s-ting
birds. Large numbers of white pelicans frequent the
coast, and are sometimes shot, measuring 10 or 12 feet across
the wings. The coasts and rivers of California alike yield an astonishing
number and variety of fish. In some of the rivers as high as 30
feet are caught, and many of the salmon are 30 lbs
are often taken in a single day. Salmon-trout
and trout also largy abound. S'urguns are sometimes taken
in the mouths of the rivers measuring 8 or 10 feet long and
weighting nearly 500 lbs. Mackeral, pilchards, and sardines
are also found in the rivers. In the sea, cuttle-fish are
caught. Oysters of excellent flavour and most other
shell-fish are found. But though fish is so abundant,
the fisheries are at present little heard.

Climate, Soil, Agriculture, &c.—California has a dry and
a wet season; the dry season lasting from about the middle
of May to September or October, the wet season setting in early in November and lasting till May. But there are con- siderable variations, both in the temperature and in the
amount of rain, according to the position of the place in country. In its northern part, north of 39° N. lat., for example, the air during the dry season is much less parched and
rainy than in the south. The climate of California is much more temperate than in the great western part of the United States. Winter is mild, the heat never especially hot and parching. In the summer the coast is visited by heavy fogs, and a cold wind sets in regularly towards noon from the Pacific, and continues to blow with increasing
force and keenness late at night. Some few miles inland
the cold is modified, and the temperature is considerably
andagreeable. Throughout the great valley of the Sacra-
mentso and San Joaquin, the mid-day heat is so great as to render labour in the open air everywhere unpleasant, and in many parts insupportable.

The soil along the great valley is generally extremely rich. This valley has evidently been at some remote period the bed of a vast lake, and the rich alluvial soil only needs judicious irrigation to render it capable of producing almost every variety of coap. The banks of the rivers however require proper embankments to prevent the present often destructive floods, and to permit the full development of its agricultural capabilities. Tobacco, rice, maize, and most of the plants
above mentioned, are also possible in the United States, cotton which grow in the warmer parts of the United
States, are impossible in California, and cannot be sheltered without great expense. The climate is in
favour with this principal valley, while in the main valley itself
most of the cereals produce extraordinary crops, and grapes, peaches, and nearly all other fruits of a moderately warm climate are produced with a luxuriance and nutritiveness, affording excellent preservation for cattle. Nor
toh 39° N. lat, are extensive forests of pine and oke. The
valleys along the coast produce all the cereals, and all or
nearly all of the fruits and vegetables of the temperate and
cold parts of Europe. Oranges are grown in large quantities;
the produce from nine counties in 1852 was returned at
5,553,655 lbs. Tomatoes are extensively cultivated in parts of
the great valley; 1,039,900 barrels were raised in 1852 in
SACRAMENTO county alone, and in the same county 385 acres
were planted with melons. In the county of Santa Barbara,
the southern part of the coast, 1,370 barrels of olives were gathered; and in this and the adjoining county of Los Angeles 78,462 gallons of wine, and 73,056 gallons of brandy
were made. Agriculture has however hitherto been com-
paratively neglected, but as more attention is being paid to the
various capabilities of the soil are becoming more
apparent, and there will be little doubt that California is destined to take a high rank as an agricultural country.
cultivates more than three fourths of its sister-states; in what it surpasses ten of the states; of maize it produces less than any other; of grazing it has the greatest extent, and grows one fifth of the produce caused by the rest of the Union; in beans it surpasses nine of the states; in hay, though only half of the counties made return, it surpasses nine states; and in fruit it excels all the states in variety, and many in quantity. At the general new town, it includes one third of the state; of mules 26; of milch-cows 12; of work-cows 8; of sheep 4; and of swine (though the returns of both these are very imperfect) 3. In live-stock it surpasses 22 of the states, though in quantity the half of the states. The number of horses returned in the state in 1852 was 64,772, mules 16,674, cows 104,379, oxen 344,457, swine 82,867, hogs 39,976, poultry 96,530—the last three the returns are from only 24 counties. The total property of all kinds, and the commerce of the State of California, is partly shown by the statement of the number and tonnage of the vessels which entered and cleared at San Francisco in 1862:—

Entered—Sailing vessels of 326,138 tons. Steamers — 137 118,676

Total 1003 445,014

Of these, 40 vessels of 18,286 tons burden were British, and 59 vessels of 72,838 tons were Spanish.

 Cleared—Sailing vessels 1333 of 336,092 tons. Steamers — 158 127,047

Total 1491 483,139

Of these, 1121 vessels of 361,166 tons burden were American. In 1849 the tonnage of the vessels entered at San Francisco amounted to 313,361 tons, of which 247,417 tons belonged to the United States. The number of passengers arriving at San Francisco in 1849 was 41,700. In the year ending December 29, 1859, there arrived 64,190, of whom 3223 were females; and there departed 22,946, of whom 390 were females.

Of the manufactures we have no very exact account. At present the manufacture is chiefly for the market of labor and the superior demands of other branches of industry, the articles manufactured are chiefly such as cannot be profitably imported. Bricks for example are now made in immense quantities to meet the enormous demand for new buildings: the county of Marin alone reported to the census agents the manufacture of 1,500,000 bricks a month during 1862, of the value in the year of 300,000 dollars; the total population of Marin county during the same year was only 10,000.

Divisions, Towns, &c.—The state is divided into 25 counties. The original capital of the state was San José, next Vallejo, afterwards Hacienda; it is now Sacramento City. The chief town is San Francisco (S. F.), on the bay of the same name; to it there are 17 miles by water. SACRAMENTO CITY (S. F.), the capital of the "digging." Numerous other towns and "cities" have sprung up in various parts of the state, but most of them are built only of wood, or even canvas, and many of them disappear as rapidly as they arose. The following are among the more important and may require a brief notice:—

Stockton, on the Stockton Slough or Canal, formed by the junction of the Sacramento and San Joaquin rivers, 100 miles E. from San Francisco by water, was founded in 1849. Population about 5000. It is the port of the southern mining district and of the valley of San Joaquin, and is likely to remain one of the first towns in the state. Vessels drawing 9 feet of water can discharge their cargoes alongside the shore. Steam-boat communication is maintained with San Francisco. At present there is no public building of any consequence except an asylum for the insane. SAN JOSÉ, population 1200, the original capital of the state, is pleasantly situated near the south extremity of San Francisco bay about 50 miles S. from N. of number of horti it has some trade, but is chiefly agricultural. Near this town is the principal quicksilver mine. VALLEJO is situated on the Napa Srait, 25 miles N.E. from San Francisco. It is merely a small village. BENICIA is an important village on the west side of Suisun Bay, about five miles E. from Vallejo. MONTEREY, population about 1600, on the south side of Monterey Bay, was one of the largest and most frequented towns of Upper California prior to its cession by Mexico, and will eventually become an important commercial place when the fine bay on which it stands is resorted to, as no doubt it will be, by shipping. At present being away from the mining districts it is comparatively deserted. SAN DIEGO is another interesting town which the great river may doubtless again grow into importance. It stands on the safe and spacious bay of the same name near the southern extremity of the coast. Coal has been found near it.

Marysville, on the Yuba, 90 miles N.E. from Vallejo, is a town of 3444 people in 1854. It is the seat of Yuba county court, the county seat of Hardin county, and the residence of the legislature. It is the most important town of the north and east. The stores, two newspapers each having 'tri-weekly and weekly issues,' and nearly 8000 inhabitants, ORIO CITY on the Feather River, the capital of the Placer mining district, has the population of 6000 inhabitants. This district is mainly among the mountains. San Francisco, was one of the oldest and most flourishing of the gold district towns, but the 'diggers' have deserted its neighbourhood, its newspapers have ceased to be published, and the place itself is worn out and fallen into decay. In 1852 its population was 40,000, but at present it is a state prison is at San Quentin, 15 miles from San Francisco. Among the other towns which either have been, or are expected to be flourishing and important places, it must be office to name Auburn, Downieville, Los Angeles, Mariposa, Napa, Nevada, Santa Barbara, Santa Cruz, San Luis Obispo, Shasta, Sonoma, Suisun, Tuolomne, Vernon, and Yuba: in all of these the population is constantly shifting, and a statement perfectly correct to day would be wholly inaccurate in a month or year.

Government, Justice, &c.—The constitution of California resembles in its general features the constitutions of the other states of the Union. Slavery is not permitted. The legislative power is in a General Assembly, consisting of a Senate of 26 members elected for two years, and Representatives of 36 members, el-ct-d for one year; the sessions of the General Assembly are held annually. The governor is elected for two years; his salary is 6000 dollars a year. The receipts for the year ending June 30, 1856, were 723,269 dollars; and expenditure 503,943 dollars; the balance was 1,366,648 dollars. The total debt of the State, Jan. 1, 1857, was 4,128,927 dollars.

The judicial power is vested in a supreme court and district and county judges throughout the state. The court consists of a chief justice, who has an annual salary of 6000 dollars, and two associate justices, each of whom has a salary of 6000 dollars a year. The justices are elected by the people for six years; and are re-elected until they are compelled to retire by age. The senior judge in office is the chief justice. The first judges of the district courts were chosen by the legislature, but all future judges are to be elected by the people: there are fifteen district judges, with annual salaries varying from 2000 to 3000 dollars. A county-court judge is elected in each county for four years.

The constitution directs that a superintendent of public instruction shall be elected, to hold office for three years; and that the legislature shall establish public schools, in which instruction (except during the first year) shall be free; and it also provides funds for their support. A Board of Education has been established, and the returns for 1856 from all but four counties exhibit 322 districts, 417 teachers, and 29,628 scholars from 4 to 14 years of age. HISTORY.—California was discovered by Cabrillo in 1542. It was next visited in 1576 by Sir Francis Drake, who named it New Albion. It was first colonised in 1768 by the Spaniards, who established in various places, chiefly west of the Coast Range, military posts (presidios) and religious stations (misions). There were four of these military stations and twenty-one missions; and while California remained subject to Spain the actual direction of the country was in the hands of the priests, the governor having scarcely any civil authority. The priests collected the native Indians in villages, and taught them to cultivate the soil, but gave them little other instruction either religious or secular. According to the latest account published by the priests there were above 18,000 of these modestly converted Indians,' besides 3000 more of the same persuasion. At present the missions from Spain the missions were broken up, and the Indians returned generally to their native state. After the declaration of Mexican independence a good many of the early settlers in California visited California for the purpose of hunting or trading, and several Americans settled in the neighbourhood of San Francisco. The government appointed by Mexico were unable to maintain tranquillity in the province, and the government increased still, in 1836, it issued in A successful revolt, mainly excited it is said by the former residents. The government was overthrown without blood-
shed, and the governor and other officials were put on board a schooner and shipped off to Mexico. The Mexican government ordered the Californians either to go to Mexico or to stay in their own country, and the country continued nominally subject to Mexico. It remained however in a state of anarchy, and for some time before its cession had become virtually under the control of American citizens. On the termination of the war and the entry of the United States California was, as already mentioned, formally ceded to the United States by treaty in February, 1848; and on its rapid growth in wealth and population, consequent on the gold discoveries, it was a year or two later admitted into the Union as a sovereign state.

(C.1von, Statistical Gazetteer of the United States, 1853; American Almanac; Fremont, Wilkes, and various Travels, Journals, &c., in California; Visits to Gold Diggings, &c.)

C. ONOM AT Y. A group of plants belonging to the natural order Polygonaceae, of which one species, C. Pallisia, yids in its roots a amlycousyummy matter, on which the Calmucks feed in times of scarcity. The fruits and branches are acid, and are chewed by the same people to allay their thirst. This plant is destitute of leaves, and grows in great abundance on the sandy steppes of Siberia.

CAMERWELL, [Surrey.]

CAMBorne [Cornwall.]

CAMPACK, of the River Loyal, 23,410; also the HAROENS, a river of Africa, which discharges itself into the Bight of Biafra and into the same maturies as the M-limba, about 45 miles from Fernando Po. It has a bar across its mouth, with an average depth of from 15 to 16 feet water over it. Of this river little is known beyond its entrance into the river. On the coast of this coast, it has been long known to be a great mart for slave. Palm oil and ivory are obtained here; the latter is considered very fine. The system of tr-flic is by barter. This river is navigable from those to the mouth by high land called the Campon Moroboines, the highest strata of which rises to 13,000 feet above the sea, and is generally capped with snow. The name is derived from the Portuguese word for shrimp, of which the is a great abundance.

Each strip of land was ceded by a section of the chief, whose friendship must be purchased by presents before any traffic is commenced.

CANDID, CHIPPING. [Gloucestershire.]

CAM-PHOARA, a genus of plants belonging to the natural order Lauraceae. This genus was constituted by Nee von Esenbeck for the Laurus Camphorifera of Kampfer, the plant which yids the Camphor of commerce. It is known by its hermaphroditic panicked flowers, 8-cleft papery calyx, a large orbicular involucre; 3-fertile, the inner row with two stalked glands at their base; the anthers e-rolled, the outer turned inward, the inner outward; the fruit placed on the obconical base of the calyx; the leaves triply serrated, glandular in the axis of the principal vein near its base.

Coffeiinum, the Camphor Laurel, is a tree with lax smooth branches; the leaves are bright green and shiny above, piler beneath, and somewhat coriaceous, with a sunken gland at the axis of the principal veins, projecting at the upper side, opening by an oval pule on the tooth. This plant is a native of Japan and China, and is cultivated in most of the warmer parts of the world. The Camphor of commerce is yied by this tree, which is cultivated most extensively in the island of Formosa, from whence it is taken to Canton, which is the principal market for Camphor. [Camphor.]

CAMPION. [Lychnis, S 1; Silene.]

CAMPBELL. [Stirling] .

CANADA.—Lower Canada, or Canada East, is divided into 64 counties, the names of which we give here with the population of each in 1851.—Bechscaroia, 40,213; Belle- chese, 17,982; Bertheir, 34,918; Bonaventure, 10,844; Chambly, 20,576; Champlain, 13,896; Dorchester, 43,105; Drummond, 16,562; Ech, 10,360; Huntingdon, 40,645; Kamouraska, 20,366; Lake Placid, 29,690; L'ile de l'Orme, 17,089; Lotbiniere, 16,587; Mégantic, 13,385; Missisquoi, 13,484; Montmorency, 9,928; Montreal, 77,381; Nicolet, 19,667; Ottawa, 28,923; Purtneuf, 19,396; Quebec, 61,512; Richer, 15,231; Richmond, 19,671; Robinson, 22,093; St. Bonaventure, 20,783; St. Maurice, 27,662; St. Hyacinthe, 30,623; Sherbrooke, 20,014; Steffee, 16,428; Stanstead, 13,898; Terebonne, 26,791; Two Mountains, 30,470; Vaudreuil, 21,297; Warden, 29,920; Yamaska, 14,745; total population of Canada East, 890,261.

In Canada East are Montreal and Quebec. [Montreal.]

QUASA.] The other towns are Three Rivers, St. Hyacinthe, Sherbrooke, and Sorel. Three Rivers is prettily situated at the mouth of the river Water, and has a population of 3,000 and has a population of 4,936. There are iron mines near the town. There is considerable industry of pot- and pearl- ashes. Three Rivers is one of the depots of the north- west traders, and is on the whole a place of some im- portance. Sorel, population 4,941, is situated on the river St. Lawrence, is likely from its advantageous situation to be of much greater importance than it has yet attained. By the Chambly Canal there is communication between Lake Champlain and the St. Lawrence, at Sorel. There is also a railway along the same line of road.

Upper Canada, or Canada West, is divided into 42 counties, as follows,—Adinburgh, population 15,165; Brant, 25,485; Bruce, 26,237; Carleton, 51,397; Dundas, 13,611; Durham, 22,892; Essex, 30,735; Grey, 13,517; Glengary, 17,596; Grenville, 20,707; Haldimand, 18,788; Halton, 18,322; Hastings, 31,577; Huron, 10,198; Kent, 17,469; Lambton, 18,105; Lanark, 27,317; Leeds, 30,380; Lennox, 7955; Lincoln, 23,668; Middlesex, 22,587; Norfolk, 16,206; Northumberland, 21,281; Ontario, 30,576; Oxford, 33,683; Peel, 24,816; Perth, 15,545; Peterboro, 15,537; Prescott, 10,457; Prince Edward, 18,587; Renfrew, 9415; Russell, 2870; Simcoe, 25,954; Stormont, 27,007; Wellington, 26,798; York, 79,719; population of Canada West, 902,004. Total population of Canada, 1,842,866.

Canada West contains the cities of Toronto, at pre- sent capital of the Canadian government, and the chief town of the colony, and Kingston. [Toronto.] Hamilton is beautifully situated at the western extremity of Burlington Bay, near the shore of Lake Ontario. It was founded in 1813, and became an incorporated town in 1839; the population in 1831 was 14,112. The construction of the Burlington Canal, a short cutting which opens a direct navigation into Lake Ontario, and the improvements of the Desjardins Canal, five miles long, which connects Hamilton with the manufacturing town of Brantford, and which are nearing completion, add greatly to the commercial value of the city. It is the district town of Gore district, and as such contains the court-house for the district and other public buildings. The streets are well laid out, and many of the houses are built of stone. There are two market-houses, one of them being a pretty little rural style used as a depot for mail and other goods, located in a well-furnished house, a post-office, and a theatre. The are places of worship for Episcopalians, Presbyterians, Wesleyan Methodists, Independents, Baptists, Roman Catholics, and others; news-rooms; and a mechanics institute. Good roads extend in all directions from the city, and numerous stage-coaches set up communication with the surrounding districts. Steamboats ply regularly during the season to Toronto and to Queenstown and Niagara. Hamilton has much increased in importance; it contains a large and populous population, and is growing into a city of importance. The city is situated 19 miles from Hamilton, and is a healthy place.

The towns of Canada West the following may be noticed:—Ankermuir, a garrison town on the Detroit
River, population 1880, is finely situated, the banks of the river in the vicinity of the town being very beautiful. The town received in 1842 a charter to hold a fair twice a year.

There are Episcopal, Presbyterian, Methodist, Baptist, and Roman Catholic places of worship, a court-house, news and reading-rooms, and a market-place. British and American newspapers are published in the town, and there are in the neighbourhood of the town. Bariage, population 1207, commenced in 1823, is now the district town of Simcoe district. There are in the town a court-house, a workhouse, a jail, and a few other public buildings. Steam-vessels ply on Lake Simcoe, which by the river Severn communicates with Georgian Bay and Lake Huron. Befellite, population 4693, situated about 50 miles W. from Kingston on the Bay of Quinte, is a place of considerable importance. It was reported in the census of 1831 that there were 690 people in the district of Victoria, several places of worship, and some other public buildings. Steam-vessels call regularly at Selville. Brantford, population 3577, on the left bank of the Grand River, about 74 miles W. by S. from Hamilton, was commenced in 1829. A canal about 24 miles long with three locks enables vessels of moderate draught to reach the town; thus avoiding the falls of the Grand River. There are chapels for Episcopalians, Presbyterians, Independents, Methodists, and Dissenting sects. There are a large dwellings, houses, saw-mills, soap-factories, and other establishments give considerable employment. Brockville, population 3246, situated on the river St. Lawrence, about 56 miles N. E. from Kingston, was founded in 1802; it is now an incorporated town, with a population of 1037. It possesses a handsome appearance. The court-house and jail, and the churches, of which there are several, are stone-built. Tanneries, saw-mills, a brewery, and other works employ some of the inhabitants. Steam-vessels frequent the river Thames, population 5743, on the left bank of the river Thames, 60 miles S. W. from London, and 50 miles E. from Detroit, is a thriving town, with an increasing trade. A canal about 18 miles long between Kingston and Brockville, with communication with Detroit and Amherstburg. There are here saw-mills, tanneries, pottery works, &c. Several places of worship in the town. Cobourg, population 3871, is situated on gently rising ground, on the bank of Lake Ontario, 103 miles W. by S. from Kingston, 72 miles E. by N. from Toronto. The town is well built, and has a good appearance. The harbour and lighthouse are of recent construction. There are churches for the leading denominations of Christians, a court-house, a mechanic's institute, &c. Victoria College, about 15 miles from the town, is maintained by the Wesleyan Methodists, but not exclusive in its management, is supported partly by a legislative grant. It has the power to grant degrees. There are here a large cloth-factory, mills, and other works. Cesare, population 2070, on the right bank of a branch of the river Thames, 14 miles S. of Cobourg, is the Cornwall Canal in the St. Lawrence, was incorporated in 1834. There are many good stone dwelling-houses, several churches, and a court-house and jail. Some tanneries, a foundry, and other establishments give employment. Dundas, population 3417, a manufacturing town, about 8 miles N. W. from Hamilton, possesses extensive water-power, which has contributed much to its prosperity. The town is surrounded on three sides by high table-land, usually termed the "mountain"; by this high land freestone and limestone are procured and exported. There are several churches in the town. There is a mechanics' institute Goderich, population 1329, on Lake Huron, at the entrance of the Maitland River, was laid out in 1827 by Mr. Galt, who subsequently procured a charter. The town is finely situated on rising ground, more than 100 feet above the level of the lake. It is about 60 miles N. by W. from London. An expensive harbour was constructed, and a light-house was placed at the point but the town has not yet proven successful. There are several churches, a court-house, breweries, tan-yards, &c. Guelph, population 1869, the district-town of Wellington district, about 42 miles N. W. from Hamilton, was laid out by Mr. Galt in 1828. It is pleasant and healthy; and the houses frequently at the point but the town has not yet proven successful. There are several churches, a court-house, &c. Hamilton, population 1850, is finely situated at the junction of two branches of the river Thames, about 56 miles W. by S. from Hamilton. It was commenced in 1822, and subsequently extend to 1840. London suffered severely from fire in 1844 and 1845, but the appearance of the town was much improved by the handsome streets of fine buildings which were subsequently erected. St. Paul's Episcopal church, erected by subscription to replace the edifice burnt down in 1844, is a beautiful gothic structure with a square tower surmounted with pinnacles. The court-house and jail, built of brick in the form of a castle; commodious barracks; two market-buildings, &c., are admirable. The North shore railway are among the public buildings of the town. There are good roads in the vicinity. Machine-making, tanning, brewing, &c., are carried on. Niagara, population 3840, the district-town of the district of Niagara, is one of the oldest towns in Canada, and was for five or six years under the name of Newark the capital of the country. It has several churches, a town-hall, and a court-house. The Niagara Harbours and Dock Company, incorporated in 1820, have constructed a number of good vessels, and the town is supplied with a few miles from the town. Peterborough, population 2191, occupies a beautiful situation on the Otonabee or Trent River, about 34 miles N. W. from Cobourg. It was commenced in 1826, is well laid out, and has a handsome appearance. The court-house and jail, and the town is called Peterborough East. Most of the places of worship are built of stone. On an elevated site behind the town is the court-house and jail, a handsome stone edifice.

There are here woolen manufactories, fulling-mills, saw-mills, chair-factories, breweries, &c. Picton, population 1452, chief town of Prince Edward district, is finely situated on the Bay of Quinte. It is an old town and contains many good stone houses. Steamers call here on their passages around the world. There are several places of worship, a court-house, a jail, and a library. A good deal of trade is carried on. Wheat, flour, leather, &c., are exported. Port Hope, population 2478, on Lake Ontario, about 8 miles W. from Cobourg, between Toronto and Kingston, is built on the site of a rich commanding interesting views of lake and inland scenery. It contains some handsome buildings, including four places of worship. Wheat, flour, and timber are the chief exports. Prescott, population 2156, on the S. W. Lawrence, about 12 miles N. E. from Brockville, possesses considerable trade previous to the opening of Rideau Canal, but since then it has not made rapid progress. Among the buildings are four places of worship and a custom-house. At this place the river is nearly broad, and the whole river is covered with green pelts as is exported. Sandwich, population not given, at arately, on the Detroit River, is finely situated and well laid out. It is one of the oldest towns in Canada, and has assumed very much the appearance of an English country town. Many flower-gardens and orchards are kept by the inhabitants. The Episco-palians and Methodists have places of worship in the town. Simcoe, population 1459, the chief town of Talbot district, is situated near the shore of Lake Erie, about 34 miles S. S. from Brantford. Grist- and saw-mills, a carding-machine and fulling-mill, with other establishments, furnish employment. St. Catherine's, population 4368, on the Welland Canal, about 12 miles W. from Niagara, occupies a beautiful situation, and possesses a good situation. Shipbuilding is in a flourishing condition, and the flour are annually exported. There are six places of work. Woodstock, population 2112, chief town of Oxford county in the Brock district, about 32 miles S. E. from London, is pleasantly situated. It is connected by the London and Woodstock, forming one street of about a mile long. There are six places of worship, a court-house, and a mechanics' institute. Considerable trade is carried on.

Of the population of Canada East, 638,261, as many as 690,261, are English, 184,261, are Irish, 132,500 are Canadians of other than French origin; 61,400 are of Irish origin; 14,505 of Scotch; 12,482 are from the United States of North America; and 11,230 from England and other British colonies. It is composed of the colonies and the colonies of the European continent, and of our own colonies.

In Canada West, the population of which is 952,004, the Canadians of French origin number 28,417, and the Cana-
dians not French, 536,093; the Irish, 176,267; English and Welsh, 82,699; the Scotch, 75,811; natives of the United States, 4,732; Batavi, 985; and Batavian refugees, 6,067. With respect to the whole of Canada, of which the total population is 1,842,263, the seven principal items stand as follows:—Canadians of French origin, 695,945; Canadians, not French, 561,673; Irish, 227,766; English and Welsh, 93,567; Dutch, 75,653; British subjects of the United States, 65,214; of Germany and Holland, 10,116. At the time of the surrender of Canada to Great Britain, the population was chiefly French, and located in the lower province. Although this class has not been much increased by immigration, it now amounts to about 1,000 per cent. The progress of Canada West has been still more remarkable. In 1791, the population was 150,000; in 1811 it was 77,000; in 1824 it was 61,007; in 1832 it was 261,060; in 1842 it was 488,005; and in 1851 it amounted to 958,004.

The amount of immigration into Canada is stated in a separate article. [Emigration, S.2.]

In January 1857, the total length of main railways in Canada was above 1,000 miles. These railways consist of two principal lines, the Grand Trunk Line and the Great Western Line, which are united at Toronto, and form a continuous railway from St. Thomas, east of Quebec, to the western boundary of Canada, or Detroit River. The Grand Trunk Line proceeds from St. Thomas 60 miles to Niagara, 22 miles to the Niagara Falls, 17 miles to Hamilton, 24 miles to Toronto, 34 miles to Lake Huron, 138 miles to Lake Superior, 17 miles to Sault Ste. Marie, 170 miles to Thunder Bay, 24 miles to St. John, 40 miles to Quebec City, 70 miles to Montreal, 90 miles to St. John, 117 miles to New Brunswick, 70 miles to Fredericton, and 100 miles to the Sea. The Great Western Line extends from Toronto through Hamilton and Chatham, to Windsor, opposite Detroit, 229 miles. There is also an independent line from Niagara Falls to Hamilton 34 miles. This gives a total length completed of 903 miles, exclusive of the Ottawa branch and other smaller railways.

The revenue and expenditure in each year, from 1845 to 1853, are as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue</th>
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<tr>
<td>1845</td>
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<td>6</td>
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<tr>
<td>1846</td>
<td>421,998</td>
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<tr>
<td>1847</td>
<td>578,822</td>
<td>11</td>
<td>3</td>
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<tr>
<td>1848</td>
<td>692,216</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>1849</td>
<td>723,724</td>
<td>7</td>
<td>4</td>
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<tr>
<td>1850</td>
<td>952,334</td>
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</table>

The imports and exports in each year, from 1845 to 1853, are as follows:

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<thead>
<tr>
<th>Year</th>
<th>Imports</th>
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<th>$</th>
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<tbody>
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<tr>
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<td>5</td>
</tr>
<tr>
<td>1848</td>
<td>4,183,013</td>
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<td>4</td>
</tr>
<tr>
<td>1849</td>
<td>6,357,577</td>
<td>19</td>
<td>9</td>
</tr>
</tbody>
</table>

Canada receives from the United Kingdom coal, metal, cordage, East India produce, and the various kinds of British manufactures; from the British West Indies, sugar, molasses, coffee, rum, and hard woods; from the United States, beef and pork, biscuit, rice, and tobacco. The exports of Canada are:—To the United Kingdom, pot and pearlash, wheat and flour, and timber; to the West Indies, beef and pork, beer, grain, and flour; to the United States, forest produce, wheat, flour, butter, wool, livestock, &c.

CANNABINACEAE, Hempseeds, the Hemp Tribe, a natural order of Exogenous Plants. This little order, which has been separated from Urticaceae embraces two well-known families, the Haploa (Haploa lutea) and the Haploa Carallus satis). They are distinguished from the Nettle Tribe by having a solitary suspended ovule, and a hooked ex-albuminous embryo, with a superior radicle. [Humulus; Cannabis.]

CANON LAW. In the university of Oxford, the com- mons have been authorised to sit for the six years off-stet at 17 & 18 Vict. c. 81, s. 45. The canon law still governs the court of the university of Cambridge.

CANTERBURY. [Zelanda, New, S. 2.]

CANTHARUS. [Cherstet, S. L.]

CANTINE. [Anvul, 1837.]

CANTON, WAR AT. [China, S. 2.]

CAPELLEN, GODFRED ALEXANDER GERARD PHILIP, BARON VAN DER, a distinguished governor-general of New South Wales, was born at Utrecht on the 15th of December 1778. He lost his father, Philip van der Capellen, Heer van Berkenwonde, before he was nine years old. After studying at Göttingen under Mar- tens and Blumenbach, with both of whom he continued in correspondence, he entered the service of Holland, and became in 1809 Minister of Internal Affairs under King Louis Bonaparte, whom he strongly advised to defend the entrance of Holland by force against the armies of Napoleon, and when the French system was introduced into the Netherlands, he was one of the first to advise his retreat at Oratza. A coolness however arose on the part of the ex-king when he found that his late minister looked with no unfavorable eye on the rising in Holland to restore his ancient liberty, and after the complete evacua- tion of Holland from the French yoke, Van der Capellen was in fact appointed Minister of C-merce and the Coloni- es, and on the 1st of August 1814 Governor-General of the Dutch East Indies. Owing to an important mission to the congress of Vienna, and the departure of Napoleon, which gave Van der Capellen an admirable opportunity of showing his constancy and courage at Brussels on the day of Waterloo, he did not leave Europe for his post till October 1815, and a further delay occurred before he finally received the appointment from that period, the government assumed the administration of the country. He remained beyond the five years, which had been originally intended, and was recalled in disgrace in 1816, when he was universally censured in Europe for the part he had taken in the renewal of the war. His return to the Netherlands was a triumph, he entered the States at Calcutta, at nine per cent, on the security of the revenues of the Dutch East Indies. It was said that all of these that could be adopted the most unavoidable was that of pledging the Dutch possessions to the English. Van der Capellen had however shown no prudence; he had, on the contrary, strongly urged the Dutch government not to consent to the English establishment of Singapore. He had however followed up the arrangements made by Sir Stamford Raffles during the English possession of Java, and by that measure immense improvement was effected in the position and prospects of the country. He had also abolished the monopolies which under the old Dutch system pressed heavily upon the natives of C-ehes and the Moluccas, made alterations and improvements much required in the state, and taken measures for the abolition of the slave trade and slavery. The most unfortunate circumstance connected with his administration was the outbreak of the great revolt of Diego Neureo, a Javanese chief, which lasted many months and which spread from the East Indies to the home state of Java. On the whole, however, when his administration came to be reviewed, the unpopularity which had collected around him gradually cleared off, and his merits are now universally acknowledged. He was nominated for several high posts, among others to that of ambassador to England on the occasion of the Coronation of Queen Victoria, President of the Commission of Education, and President of the University of Utrecht. In February 1848 he was unfortunately on visit to Paris, on an invitation from King Louis Philippe, who was a personal friend when he was on the outbreak of the revolution he was struck on the head by a stone thrown by one of the mob. No outward injury appeared, but on his return to his seat at Volkheuven he sunk into a deep melancholy, produced partly by his feelings at the events he had witnessed and this was succeeded by an inflammation of the brain, which carried him off on the 10th of April, 1848.

CAPPOQUIN. [Watersford.]

CARAPA, a genus of plants belonging to the natural order Meliaceae. C. Toulouwouhna yields the Talloowouh or Kundar Oil, which has a reputation as an antihelminthical. It is said to be well suited for burning in lamps. The bark of the root of C. obovata is bitter and astrigent. The bark of C. Gu- mmosa is also used as an antihelminthical and febrifuge.

CARBUNCLE. [Gnænaet.]

CARDIOSPERMUM, a genus of plants belonging to the natural order Sapindacea. The root of the one species, C. cardiospermum, is an emetic, diaphoretic, and antipyr- ent. In the Moluccas the leaves are cooked and eaten.

CARDIUMA. [Conchacka.]

CARDUELIS. [Golfinch.]

CARIA. [Karia, S. 2.]

CARLINGFORD. [Lothv.]

CARLOS, DON (Comte de Molina), Infante of Spain, and
the Spanish throne, was the second son of Carlos IV of Spain, and was born on the 29th of March 1788. Left chiefly in the hands of priests, to whom the superintendence of education had been entrusted, Don Carlos remained in comparative obscurity during the domination of Godoy. On the first abdication of his father and the accession of his brother Ferdinand VII, Don Carlos was sent to meet Bonaparte, who had announced his intention to visit Spain. The young prince, including General Castanos in his retinue, was made in effect a prisoner, and Ferdinand, like his brother, soon found himself also in the hands of the French. Bonaparte next compelled the weak ex-monarch of Spain to proceed to Bayonne, and refusing to acknowledge his former aberrations, required him to abdicate in favor of his own son, Louis XVIII, to whom he offered the crown for himself and his posterity, to "abridge all claims to the Spanish kingdom in favor of his ally the Emperor of the French." In this renunciation, after a strenuous opposition, Don Carlos, as well as Ferdinand, was compelled to join. The brothers were sent to Prince Talleyrand's house at Vallençay, where they were detained prisoners, though treated with great respect, till 1813, when Napoleon restored them to liberty, and Ferdinand to the throne of Spain.

When, after the suppression of the constitutional party by the French invasion under the Duc d'Angoulême, Ferdinand appeared inclined to adopt a somewhat more moderate policy, the absolutists turned their attention towards Don Carlos, and demanded his restoration. The counsels of a formidable character was organised, and an insurrection broke out in Catalonia in 1805, but was repressed by the vigorous measures of the Count of Espana.

Don Carlos had himself taken no open share in the insurrection, according to his principles, in favor of his brother's throne, and it is probable he was anxious not to endanger his succession by a premature declaration. His hope of legal succession was however quickly dispelled. Ferdinand had been three times married without having any children, but by his fourth wife, Dona Maria Isabella, he had in October 1809 a daughter, Isabella, the present queen of Spain. By the ancient laws of Spain females could inherit the crown in default of male issue; but the Salic law of France had been so long disregarded as to be almost forgotten. Ferdinand, excluded from the throne till 1812, when Carlos IV abdicated the restriction, and restored the ancient rule of succession. In 1812 however the Cortes re-established the Salic law, and Don Carlos was therefore still the heir-presumptive to the throne. But Ferdinand now issued a decree which annulled the provision of the Cortes, and restored the order of succession in the female line. Don Carlos protested, but remained quiet. His partisans however throughout the kingdom prepared for the big ligue, and it might have been distantly seen.

In September 1833 Ferdinand was believed by himself and those about him to be dying, and the feebile king, terrified at the mischiefs which he was assured would result from the disposal of the crown to his son, wrote to Castanos, after obtaining the advice of his favourite minister Calomarde, signed a decree by which he restored the Salic law. Ferdinand however rallied, and was easily induced by his sister-in-law to destroy the evidence of his recent vacillation. He died a few days later, and his death was the signal for a general rising of the adherents of Don Carlos in opposition to Queen Isabella, who had succeeded to the throne of her father.

For full five years Spain was desolated by a civil war, in which at one of the most unfortunate battles which has ever disgraced a civilized country. Spain was supported by the great body of the priests, by a large portion of the country party, and by nearly the whole of the inhabitants of the Basque Provinces—the bravest and most devoted portion of the Spanish people. Had he been a man of more energy and ability, the great probability is that he would have succeeded. But he possessed in full the hereditary bigotry, weakness, and obstinate folly of his race, and he more often marked the narrow limits of his general character. Yet the energy and courage of his genera's, Cabrera and Zumalacarregui, maintained the balance decidedly in his favor, till the valuable aid of the British legion under General Sir de Lacy Evans, and the death of Zuniga, which caused the retirement of the Basque Provinces from the service of the Crown, and the surrender of his army to Espartero in August 1839, left Carlos no alternative but flight, and he at once took refuge in France.

Louis Philippe assigned him, a residence in the city of Beuges, where he was joined by his family, and where for some years he maintained a mimic court, in which was observed all the elaborate etiquette of the Spanish monarchy. At length, sick of hope deferred, he in 1845 formally relinquished his claim to the Spanish crown in favor of his eldest son Don Carlos Luis Maria Fernando, Count de Montemolín. The abdication of Don Carlos was strongly opposed by his wife, the Princess Maria Theresa (daughter of John IV. of Portugal), and by his leading supporters, including General Castanos in the hands of the Queen-en; and the subsequent rising in favor of the Count de Montemolín was easily suppressed. Don Carlos was permitted in 1847 to remove to Trieste, where he remained in strict retirement till his death, March 10th, 1856.
FCAS

Ferdinand, who was very fond of him, circulating amongst the lower classes. Among other posta of dignity, he held that of the shrine of the Virgin, the patron saint of Madrid, which he died at Madrid, on the 24th of September, 1858, and his remain were honored with a public funeral.

CASTEL VETRANO, a town in the province of Trapani, in Sicily, is situated near the left bank of the Dania, 10 miles E. of Castellammare, and is a notable one of the most ancient in Sicily. It is situated on the 30th mile of the road from Palermo to Trapani, about 6 miles from the nearest point on the south coast of the island, and has a population of about 13,000. The town is famous in works in coal and alabaster. It is built on a hill, and is an old fortress, with an ancient wall, several gates, columns, and palaces. The country round Castel Vetrano is fertile in wine and rich pastures. A few miles from Castel Vetrano, to the south-eastward, are the ruins of the ancient Selinunte. This ancient site is covered with broken columns, capitals, and fragments of the Doric, and of large dimensions; they are called 'Giante Pillars' by the peasantry. Some finely sculptured metopes were discovered at the base of the façade of the central temple in 1892. There are ruins of six temples in all.

CASTELLAMMARE, the chief town of a subdivision of the province of Napoli, in the kingdom of the Two Sicilies, is situated near the head of the Bay of Naples, on the lower slopes of the island of Monte Sant'Angelo, 15 miles by railway E.S.E. from Naples, and has a population of 18,000. It is connected by a branch railroad with the Naples-Nocera line, the first railroad opened in Italy. The town stands on or near the site of the ancient Stabiae, and is built on the slopes of the ancient Mount Vesuvius, in the eruption of A.D. 79. During this eruption Pliny the elder lost his life at Stabiae. The hill above Castellammare is called Monte Qui-si-sana from its being covered with vines and cypresses, among which is the latter is the royal casino of Qui-si-sana, founded by Charles II. of Anjou, and now the property of the Russian prince Leveen. Behind the hill rises the imposing mass of Monte Sant'Angelo, which will again be discussed; through the forested pines runs a road, and forms a conspicuous object between the bays of Salerno and Naples. The town derives its name (signifying 'castle by the sea') from its castle, which was erected by the emporor Frederick II., surrounded by walls and towers by Charles I. of Anjou in the 13th century, and subsequently strengthened by Alfonso I. of Aragon. The town was sacked by the army of Pius II. in 1461, and again in 1564 by the Duke of Guise. The harbour has a depth of three to four fathoms wide, it is 1,100 feet in length, and has three whitewashed mole. In connection with the harbour are a bagnio for galley slaves, and a royal arsenal and dockyard, where the ships of the Neapolitan navy are built. These establishments contribute materially to the prosperity of the town. Castellammare has a noted hospital and a public school. The waters of this town are famous for their mineral springs, which are very efficacious in gout and rheumatic affections. There are twelve of these—four chalybeate, four saline, and four sulphurous—and they all rise at the base of the Monte d'Auro, within a short distance from each other. They are all of moderate temperature, seldom exceeding 65° Fahr. Great numbers of visitors frequent Castellammare and its delightful neighbourhood during the summer and autumn; the temperature is 8 or 10 degrees lower than that of Naples. The town, which gives title to a bishop, and has a handsome cathedral, is well built, partly on the lower slopes of Monte d'Auro, but chiefly along a sheltered beach commanding a view of the whole bay of Naples. Here the wheat is exported; the chief imports are coal, timber, and machinery. Among the industrial products are maccaroni, silk and cotton goods, and salt-cloth. The fisheries along the coast employ a good many hands. Some excursions made among the ruins of Stabiae in 1748 brought to light a few fragments of faience, some pottery, and paintings, which are now in the Museum of Naples.

There is another Castellammare, or Castellamare, in the province of Trapani in Sicily. It is situated on the southern shore of the Gulf of Castellamare, 28 miles E. from the town above mentioned, and about 20 miles W. of Palermo; it has about 6000 inhabitants. The town, which is ill-built and dirty, is named from its old decaying castle. It carries on a considerable trade by sea, and has large granaries; the exports are wine, oil, and tobacco. The remains of the ancient Segesta are near Castellamare; they consist of a Doric temple in tolerable preservation, the ruins of
nearly the whole of a summer, engaged in the study. To
wards the end of this travels, which lasted for four years, from 1843
to 1849, he crossed the Tundras, or deserts of European
Russia, and also the mountain ranges which were not even the
rein-deer can from the wintry blast and live. Philosophy
has its martyrs as well as religion. Castrén returned with his
constitution poisoned.

While on his travels he had written most interesting and
anecdotes of his adventures and discoveries, which were published in the Svaomi, an excellent periodical in the Swedish
language published at Helsingfors. Many communications from him on learned subjects, chiefly written in
German, appeared at the same time in the Zeitschrift der
Sveicirischen Gesellschaft der Wissenschaften. His name was universally known as that of a philologist of the
first rank, but it was not till March 1851, on the occasion of a
visit of the Grand Duke Alexander, the present Emperor
of Russia, to the University of Helsingfors, that he was, from
the possession of a private document, or private tutor, to
that of professor of the Finnish and old Scandinavian lan-
duages. One of his duties was to deliver a course of lectures
on Finnish mythology, which he immediately commenced
composing, but before that he could be finished he was no more.
He died at Helsingfors on the 7th of May, 1858, from the
effects of his ruined journey.

The translation of the Kalevala, and some of Castrén's
other works, have been already mentioned. His lectures,
Veistä, or Finnish Mythology, were published in
Germany at St. Petersburg in 1853 under the editorship of
Schleifer. A German version of his travels by Helms was
published at Leipzig in 1856, and translated at some length in
the Quarterly Review. His other works were mostly of a
philological character, in which he was eminently noted;
and as such he ranks with the Finnish, the Swede, and
other dialects scattered over the surface of European Russia,
to investigate which was the object of Castrén's devoted
exertions. It is much to be regretted for the sake of learning,
as well as on other accounts, that he was snatched away
before he had time to communicate to the world the results
of his dauntless and ingenious labours.

Catalysis. [Chem. Trans. 1.]

CATARAQA, one of the upper provinces of the Argentine
Confederation, lying north and west of Buenos Ayres, is bounded
by the provinces of Tucuman, E. by Santiago, S. by Cordova,
and W. by La Rioja, and comprehends the little visited
country between the mountain ranges of the Sierra de Acon-
quejo and Ambato on the east, and the Andes on the west.
The climate is healthy, and the valleys are fitted for
agriculture, and the soil well adapted for vineyards.
Cataras, from which the province derives its name, and in
which most of the inhabitants are settled; and of some other
valleys, running between mountain ranges south-east and
north-west, and terminating at their
western extremities on the borders of the Gran Salinas, being
distinctly separated from the other inhabited countries by
high mountains and deserts. The rivers which water these
valleys are lost in the Gran Salinas. The climate is sultry,
especially when the suns winds blow, which come over the
desert. Malachite and other copper-bearing ores are found
in the province; but the copper is not easy to be
extracted from the copper oxide. The provinces sends
only cotton and red pepper (dried capsicums) to the adjacent
countries, the latter chiefly to Buenos Ayres, where it is
extensively used. The present capital is Catamarca, or Sem
Fernando del Palle de Catamarca, in 7° 25' S. lat., whose
population is stated to be 4000. The first capital, called
London, which was founded at the time when Philip II. of
Spain married Queen Mary of England, was destroyed by
the Indians.

CATHA, a genus of plants belonging to the natural order
Celastracea. C. edulis is the Kat or Khat of the Arabs. It
would appear," says Dr. Lindley, "to be of a stimulating
character. According to Forskal the Arabs eat the green
leaves of this plant. Dr. Lindley sees in it a very
powerful nerve cord, which may be stood as an antidote to
insanity, and as a person wearing a wig of it in his bosom may go among the
people with impunity; they even believe that the plague cannot
appear in places where the tree is cultivated." (Vegetable
Kingdom, p. 537). At the same time Forskal adds, "The
f Автор этою доскою не видел этого вида." (Catharine's, St. [Canada, S.].

CATHICART, LIEUTENANT-GENERAL THE HON.
SIR GEORGE, K.C.B., was born in London, on the 18th of
May, 1754, the son of William Shaw, the first Earl Cathcart.
He was educated at Edinburgh University, and entered the
Army in 1772, by appointment to the 3rd Light Infantry, and
in 1810 he began his military life by joining the 2nd Life
Guards. In 1812, by which time he had been promoted to
a lieutenancy, he was appointed to the command of the
Russian Forces in the province of Moscow, and when the Emperor
Alexander took the field in
person in 1813, Lieutenant Cathcart joined the imperial
Army. He served with the grand army throughout the cam-
panes of 1813 and 1814, witnessed the battles of Lutzen and
Bautzen, those of Dresden and Leipzig, of Brienne, Bar-sur-
Aube, Arcis-sur-Aube, and the taking of Paris. Of these
campaigns, and more particularly of the strategy of Nape-
olin, he has left an account, accompanied with diagrams showing the position of
the armies, with their movements. It is a valuable work;
an additional interest being given to it by an introduction to
the service of the Allied Powers, as well as of the French,
and displaying the skill and powers of national character under the different circumstances of
attack and defence. In 1814 he again accompanied his
father, who was one of the three plenipotentiaries sent to
Paris. On the 9th of March he was appointed aide-de-camp to the Duke of Wellington, and
was present at Quatre Bras and Waterloo. He was continued in
the appointment when the Duke became master-general of
the ordnance. He accompanied him on his mission to Algier,
aud to the Grand Duchess at Baden, and to Berlin. In 1812
he had arrived at the rank of Lieutenant-Colonel, and served for some years in Nova Scotia, Bermuda, and Jamaica. In 1834
he retired on half-pay; but in 1837 was recalled into active
service by the Duke of Wellington, and served under
him in Canada, where he proved himself an active and efficient officer. After serving there for more than six
years he returned home, and again retired on half-pay in 1844.
In 1846 he was made Deputy-Lieutenant of the Tower, an office which he held till 1853, when he accepted the
governorship of the Cape of Good Hope, with the command of the forces, and brought the
Kaffir insurrection to a successful termination. On his
return to England he was immediately sent as General of
the Forces to the Crimea, where much was expected from a
man so thoroughly acquainted with the geography of
his profession. He however had short time to display his
capabilities. In the battle of Inkerman, on the 5th of
November 1854, where he displayed the most heroic bravery,
served under him in which he was so perfect a
force so superior that it failed in the desired effect, he fell, to
together with the other leading chiefs. He was buried on the spot
—Cathcart's Hill—by the other officers who had fallen.

CATLINGITE, a form of argillaceous mineral called Pipe-
stone by the North American Indians. It comes from the
Couteau des Prairies, and is a red claystone or compacted clay.
A similar material is now accumulating on the north shore
of Lake Superior, at Nipigon Bay. Another variety is used
by the Indians of the north-west coast of America. (Dans,
Mineralogy).

CATH. MINT. [Naveta, S.]

CATH'S-EYE, a form of Chacodony, of a greenish-grey
colour, having a peculiar opalescence, or glaring internal
refractions, like the eye of a cat, on looking to the
filaments of asbestos. It comes from Ceylon and Malaya,
and possesses considerable value as a gem. (Dans,
Mineralogy).

CATH'S-TAIL GRASS, the common name of Phlim
pennsylvanic, an agricultural plant, also called Timothy Grass.
(Phila.)

CAUCHY, AUGUSTIN LOUIS, mathematician, was
born at Paris, Aug. 31, 1789. His father, Louis Francis
Cauchy, was a poet, and became archivist of the Chamber
of Peers. The son was carefully and religiously educated.
He entered the École Générale in 1804, while at the École Générale
Cathcart, the pupil of the pupil, which had carried off most prizes,
among which was the first in Latin poetry. In the following
year he entered the École Polytechnique as second scholar,

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and in 1806, when only in his seventeenth year, his solution of a difficult problem was printed in the 'Correspondance' of the Academy of Sciences.

From the École Polytechnique, where he rose to the first place, M. Cauchy entered that of the Ponts et Chaussées, maintaining the same position. He was afterwards appointed one of the auditors of the École Polytechnique, and continued this position until his death in 1857, in 1813 he published his 'Méthode pour déterminer les intégrales des équations différentielles' and 'Extraction d'un degré quelconque,' which was followed by papers on the properties of integrals, taking up questions started by Clairaut. In 1816 he received the grand mathematical and physical prize of the Institute for his paper 'Sur le calcul des forces...,' which became the basis of a theory of light.

In 1818 Cauchy was elected a member of the Academy of Sciences, and was appointed professor of mechanics in the École Polytechnique, and in the same year he published his demonstration of Fermat's theorem of the polygonal numbers. His lectures had a most salutary influence on the educational results of the school, and the progress of his pupils was materially aided by the works which he successively published: 'Mémoires sur le Calcul des Finités,' 'Lesons d'Analyse,' 'Mémoires sur le Calcul des Residus à la Solution des Problèmes de Physique Mathématique,' 1827; 'Sur la Réolution d'Equations Numériques, et sur la Théorie de l'Elimination,' 1829; 'Sur la Théorie des nombres,' and others. The last was presented in May 1830. The revolution which followed deprived M. Cauchy of his public employment, as his loyalty to the Bourbon dynasty prevented his taking the oath of allegiance to the government of Louis Philippe. Under this government he was appointed to the office of President of the Bureau of Sardinia, which invited him to deliver a course of physical-mathematical lectures at the university of Ternin. In 1832 the Royal Society of London elected Cauchy one of their thirty foreign members. In the following year he received an invitation from Dr. C. X to undertake the scientific education of the Duc de Bordeaux, which then resided at Prague; and he cheerfully devoted himself to the task. While thus engaged he resumed in 1833 the publication of his 'Mémoires de l'Académie de Marais,' of which he had been for some years interrupted. In 1836 he published his 'Mémoire sur la Dispersion de la Lumière.' In 1838, having terminated his work of instruction, he returned to Paris, and took part in a scheme for training a superior class of public schools. The results of legislation were disappointing, and he was dismissed as a member of the Bureau of the Longitude in 1839, but the minister refused to sanction the choice, remembering the refusal to take the oath of allegiance.

Cauchy's diligence appears to have increased with his years. The number and nature of his communications to the Academy almost bespeak judgment by reference to his 'Comptes Rendus;': at one time they became so multiplied that their publication overstrained the Academy's funds. Concurrently he wrote papers which appeared in other scientific periodicals, chiefly in Louisville's 'Journal de Mathématiques,' among which his 'Notices sur le Développement des Fonctions en Séries ordinaires suivant les Puissances ascendantes des Variables,' published in 1838, is especially remarkable.

In 1840 a professorship of mathematical astronomy having been created at the Faculty of Sciences of Paris, M. Cauchy was appointed to the chair; but, as had happened eighteen years before, his refusal to take the oath required in 1832 to take his public employments. He had continued his studies; adding every month to the number of works. He treated of the higher branches of algebra, the theory of numbers, the infinitesimal calculus, mechanics, astronomy, and physics, exploring indeed every branch of mathematical analysis. The limits of the integral calculus; and if showing a preference for abstract questions, he on the other hand rendered important service to the elementary parts of science, by simplifying the study of asymptotes, introducing the use of limits in the parts of geometry, and by giving an elegant demonstration of the fundamental theorem of the theory of equations.
the Parvis de Temple. On the second day of the insurrec-
tion, Paris was declared a city of siege, and General
(Prussia's) "March in Picardy," all the troops in France
being committed to his charge. After four days' la-
during the contest came to an end by the defeat of the
enemies. The loss on both sides was appalling: two
regiments were killed, four others mortally wounded.
In all, some 8,000 persons were killed and wounded, and
14,000 made prisoners. No sooner had he quelled this
retrograde than the general laid down his authority. The
National Assembly appointed him President of the Coun-
cil, but it was too late. He was there in 1843. The
League, in 1843, was the only covered with a
hundred miles. But he was afterwards allowed to reside
undisturbed in Prague, and it was there that he
published his great work, "The Philosophy of Slavonic
Literature," in 1855. It was at that time the favourite
language of Bohemia, and he then commenced the
study of the Slavonic languages, and made himself master of
them all, as well as of Italian, French, and English, and at
this time made a grand tour of the Slavonic countries.

The most important of the Slavonic countries, says
his biographer Maly, which would be of some interest, but does not appear to have been
printed. His first publication was a volume of "Poems,
which was soon followed by a Bohemian translation of
Herder's "Stella Maris," and a Slavonic translation of
"Feudal Slavonic," says his biographer Maly, which
was the period of transition from the old classic to the
modern style in Bohemian literature, and that the
translation was "the earliest classical specimen of modern
Bohemian prose." A more important production was a collection
of Slavonic national songs, "Slovakie národní písně," in
two volumes (Prague, 1827-28), a publication somewhat
resembling the "Minstrelsy of the Scottish Border." In 1834
Celakowsky purchased a portion of "Lady of the Lake," and
"The Poetical Works of Sir Walter Scott," to assist
in his next translation, the "Choral písni Rusky," a
collection of Russian national songs, so beautifully rendered
into the kindred Bohemian that they at once took a very
high place in the literature of that country, and still retain it.

Bohemian was at that time the favourite language of Cela-
kovsky, and the Russian nation was high in his esteem, so
much so that he lost the friendship of several of his Bohe-
man acquaintances on the outbreak of the Polish insurrec-
tion in 1831, from taking the part of the Russians against
the Poles. He had then been for some time the editor of
the leading Bohemian newspaper at Prague, a post to which
he had been recommended by his patron, Count Chotok, and
he was also professor of the Bohemian language at the
university. When the Polish insurrection was suppressed how-
ever, he disapproved of the severity of the measures adopted
by the Emperor Nicholas, and in an article of his paper
condemned the proceedings of the Czar to the tyranny of the
fatherland of the Golden Horde over conquered Russia, in
which happened to pass the censorship, but did not elude
the vigilance of the Russian embassies at Vienna; a complaint
was made to the Austrian government, and the unfortunate
author was dismissed from his establishment and his
profes-
sorship—or in other words, he was ruined. A paradox of
bitterness Celakowsky composed a volume of epigrams
against his persecutors, but as might be expected, the per-
sons to print them was refused. He obtained the place
of librarian to the Princess Kinisky, and published some
poems of a milder character, of which the "Hundred-Leafed
Rose" ("Roz Stobieta") is spoken of as the finest. His fame
was at this time widely extended. Dr. Bowring, now Sir
Cornelius, dedicated the second edition of his "History of
Anxiety," in some stanzas in which he spoke of the kind-
ness Celakowsky had shown him on his visit to Bohemia,
and the material assistance he had afforded him in the
pre-
paration of the volume. The present King of Prussia was
soon after his accession induced, by a deputation, to pro-
found professorships of Slavonic literature at two of his uni-
versities, Berlin and Breslau, and Celakowsky was offered
the choice of either. He selected Breslau, and removed there
in 1843. He enjoyed his second competence, but in what
appeared to him a exile, in a country which had ceased to be
Slavonian. He was always eager to grant any Slavonians
who came to Breslau, and the time of vacation always found
him at Prague. At length the events of 1846, so disastrous
for the liberal mass of Slavonic democrats, brought to the
capital led to its bombardment by Windischgrätz, brought
about Celakowsky's return to his native country.
In the following year a Professorship of Slavonic Philology
was instituted at Prague as a concession to the national party,
and it was offered to Celakowsky, whose offers were pro-
bably considered as sufficiently expiated by his seven years'
expatriation. He returned, but his friends perceived that he
was no longer to remain among them. Always of a somewhat
optimistic taste and in a way wild and passionate, he
found himself in a domestic calamity, particularly the loss of his
wife, who left him burdened with a large family of children, had shaken his
mind. He died on the 6th of August 1853.

Some of Celakowsky's works have been already men-
tioned. The most important of his publications is his
"Mudrošivá různice slovenšćeho v pravičći" ("The
Philosophy of the Slavonic nation in prose"), a valuable
collection of that nature, attracting much attention on its
appearance after the era of 1848, and so much increasing
his hitherto large manuscript collections, which are likely to be
the light under the editorship of a friend. He had also
been for years engaged in collations for a supplement to the
valuable Boho-mian dictionary of Jungmann, and on an
other occasion was a contributor to the Czech and Slavo-
nic dictionaries, as in the great Polish dictionary of
Linde. This work is also desired for publication, and, it is antici-
pated, will prove a contribution to Slavonic literature of the
very highest value.

CELANO, the ancient Freccia, a lake in the Abruzzi
in Italy. It is remarkable as being almost exactly in the centre
of the Italian peninsula and the only lake of any consider-
able extent in the Central Apennines. The lake is nearly
in a right angle in shape, about 4 miles in breadth and
about 2176 miles long, and surrounded on its west by
the Garigliano, a large, long, and narrow stream, and
its surplus waters were carried off by subterranean
channels, the opening of one of which is still visible, and called La Pedogna, a name clearly
derived from Plutarch. The lake, however, was too insufficient, the lake frequently overflowed the low-lying
areas along its banks. To obviate the evil, Julius Cesar designed to cut a tunnel from the lake into the valley of the Liris; his plan, however, was not carried into effect till the reign of Claudius, who celebrated the opening of the tunnel with great magnificence.

In the middle ages the tunnel became obstructed by the
falling in of stones and earth, and many attempts have been
made since the year 1540 to render it efficient in preventing
inundations of the lake, but without success. Between 1745 and 1850 the encroachments on the lake had swallowed up about
20% of its area, and in 1870 the system of embankments and repairs, however, were made at the expense of the King of the
Two Sicilies, under the direction of Signor de Rivara (who examined the tunnel in detail, and described it in 1852), and the ancient
lake was considerably restored as to carry off a constant, though not a large, stream of water into the
Liris, or Garigliano. The area covered by the lake, according to a late official survey, is 36,315 acres. A company
was formed at Naples in September 1862 to effect the
complete drainage of the lake.

Considered as a remnant of antiquity, the tunnel of
Claudius is an exceedingly interesting object. At the opening of it, near the lake, the tunnel is about 80 feet high and broad, and then it contracts gradually as it advances through the mountain. Its whole length is three miles. It is in part cut through the solid limestone of Monte Salviano, and in part through a chalky earth that has little tenacity. At the further end the lower substances occurs, the tunnel is supported by machinery of admirable workmanship. To admit light and air the Romans sank shafts from above. The entrance to this tunnel is about a mile and a half to the south of the town of Avezzano, on the north-west shore of the lake.

CEI.BRIDGE. [Kidman.]

CELLS. The ultimate structure of animal and vegetable bodies consists of minute vehicles, which are called Cells. In both animal and vegetable structures these organs are not generally visible. The muscle derived from a 1-600th to the 1-1000th part of an inch in diameter. In all cases they consist of an enveloping membrane or cell-wall, which incloses in a space more or less enlarged certain constituents, called cell-contents. The nature of the substances which enter into the composition of the cell-walls and constitute the cell-contents, differs in the animal and vegetable kingdoms, but there are certain properties which all cells possess in common. Sometimes these properties are essential to the cells, and in other cases, it appears they are possessed by inorganic or mineral bodies, which are called cellular. It will, however, be seen, that, independent of the formative power by which particles of gelatine, cellulose, &c., arrange themselves in the form of cells, and again these cells arrange themselves into the form of organs; and further, that the formation of a cell is, in some form, there are few of the functions performed by cells that may not be referred to the action of physical forces. One of the first and most necessary conditions of the cell is, that it shall allow of the passage, through the membrane of which its walls are composed, of those substances by means of which it grows, and which it acts upon for the production of the peculiar secretions which characterise either specific beings or parts of their organisation. This function, which is of the greatest importance to the practical relations of life, which exist between liquids and gases and the membrane of which the cell-wall is composed. [Assimilation.]

The liquid or gaseous contents which are thus introduced into the interior of cells undergo a variety of changes, according to the position, age, or other circumstances of the cell. Sometimes the fluid that is absorbed appears to be transmitted in compound structures from cell to cell without undergoing any great amount of change. In other cases, the materials thus taken in are converted into new substances. The cells of some parts of vegetable structures are an instance of the latter, in which carbonic acid and ammonium are absorbed with water, and converted, either during their passage through the cell-wall, or whilst in the interior of the cell, into carbonic acid, of the gas, organic matters forming part of the cell. In other parts of plants the cells convey solutions of sugars and other substances without producing on them any change.

The constituents absorbed into the interior of the cell are the materials from which the cell-wall and all its contents are derived. The process by which the cell appropriates to itself these matters is called Assimilation. This function is supposed to be carried on by an independent force or power residing in the cell, or organies of cells, which form an organ or a body, and has been called the assimilative force or property, 'organising force,' 'plastic force.' It is necessary however in this process to separate between the changes by which one substance is converted into another, and the changes which arise solely from the use of ordinary chemical forces under other circumstances, and the power or force by which these substances are made to assume definite forms in cells and organs. The latter is a special force in the case of each cell, plant, or animal, and to which alone, of the changes involved in the function of assimilation, the term vital can be properly applied.

The result of the appropriation of the new matter absorbed from without in all cells is their enlargement or growth. The manner in which this takes place is either the new matter taken up into the interior of the substance of the cell-wall, which is always the case where the cell becomes augmented in size, or it is deposited in the form of layers in the interior walls. According as the first mode of growth is regular or irregular will be the form of the cell. The vegetable and animal kingdoms present almost all conceivable forms of cells, from the spherical and hexagonal cells observed in the vegetable kingdom, and the less organised tissues of animals, as cartilage, up to the elongated vessels of the plant, and the irregular cells of bone and areolar tissue in animals.

The animal kingdom presents by far the greatest variety in this respect, and so great are the changes that some of the animal cells under the term cellular metamorphoses of transformations have been applied to these changes. As examples of these cells we may quote—the hoarse scales of the epidermis, of the hair and the nails, and the laminated pavement, epithelium—in which the cells are flat, the nuclei are displaced, and the cell-wall is fused into one mass with the cell-contents; the contractile fibres-cells of the smooth muscles; the tubules of the lens; the prisms of the enamel; the various forms of bone-cells; and the transversely striated muscular fibres.

All cell-origins are or produced in the same way. Either they are developed free in vegetable or animal fluids, or they are produced in the interior of preceding cells. In all cases they originate in connection with a substance called protoplasm, which exists in cells, either in the form of a small dark spot called a nucleus, or cytoplasm, in the interior of which is a nucleolus, or of an expansion on the interior of the cell, when it is called the primordial utricle. Free cell-development has been observed to take place in plants, in a vessel of sap, and in the sap of the paramecium. Absorption—certain, and amongst animals in the chyle, blood, and lymph. The exact mode of the development of cells under these circumstances has not been accurately observed; and the particles or granules of protoplasm, which separate from or are yet been proved to have had their origin independent of other cells. The most common form of cell-development is that in which the cell grows around or from the nucleus or primordial utricle. In the case of a cell surrounded by a mass, it is said to take place around the nucleus, whilst in the vegetable kingdom its origin is more frequent from the folding in or contraction of the primordial utricle upon itself, by which means two cells originate in one.

One of the highest problems for the physiology of the present day to solve is, the efficient causes of the phenomena of cell-development. The following propositions have been laid down by Külliker as an attempt to follow up Schwann's principal solutions, and which demonstrate the changes in inorganic bodies and those which occur in cells:

1. The nucleus of the cell arises in the first place as a precipitate in an organisable fluid, and afterwards becomes consolidated in such a manner that a special investment and contents with a nucleolus appear. Its development may in this case be compared to that of inorganic precipitates, yet the constantly globular figure and size of the nuclei which are just formed, indicate some essential though not yet recognised condition peculiar to them.

2. In the development of cells by division the cell-nucleus plays exactly the same part which was previously ascribed to the nucleolus, and the occurrence of the formation of cells in this manner demonstrates that chemical conditions are not necessary in the development of cell-sides.

3. In cell-development around portions of contents, and in the cleavage-process, the nuclei also operate as simple centres of attraction on a certain mass of blastema, and then follows the formation of a membrane upon the surface of this mass. This is most simply understood as a condensation of the blastema.

4. In the cell-development directly around the nucleus the investment with blastema is wanting, and the nucleus deceased in the interior of the cell.

From what has been previously said, it will be seen that the cells are the active seat of the functions of both animals and plants, and the most conspicuous results of organisation take place in consequence of their agency. They not only constitute the mass of the body, but by their agency the special secretions and products of individual plants and
animals are formed. The food is conveyed into the body by cells, the blood of animals is charged with cells, and the essential functions accompany the agency of cells. Nor are these last functions peculiar to the animal kingdom. Contrastibility and sensibility seem to be the property of the substance (protein) of which the nucleus and prismatic unit cells are composed. To this substance Mr. Dana, however, subscribes a much greater significance, and includes a lecture on the identity of structure of plants and animals:

In b-th plants and animals there is one histochemical character and structure. If the formative organ be divided in a vegetative way, the new substance (the cell membrane) being the subject of all the chemic and morphological metamorphoses, in consequence of which specific tissues arise. The differences between the cells of the endoderm and the mesoderm, in plant and animal life, and, as the prismatic unit, attains a large comparative size; while in the animal the Endoderm remains small, the principal bulk of its tissues being formed by the prismatic substance; and, 2, in the nature of the chemical changes which take place in the prismatic substance in each case.

This distinction however does not always hold good, the Asidnus furnishing examples of animals whose prismatic substance contain cellulose. Each cell, each plant, is inclosed in a wooden case and nature, like Sycorax, holds thousands of 'delicate Areals' imprisoned within each oak. She is jealous of letting us know this; and among the higher and more conspicuous forms of plants reveals it only by such obscure manifestations that they are required to counterfeit the Bus, to imitate the Drosophila, or, still more slightly, by the phenomena of the Quedia.

But among the immense variety of creatures which belong to the invisible world she allows more liberty to her Dryadse; and the Protocerci, the Velumis, and indeed all the Arthropoda, are during one period of their existence as active as animals of a like grade in the scale. Then, they are doomed eventually to shut themselves up within their wooden cases and remain quiescent; but in this respect they are no worse off than the Lepidoptera and other insects of a like state.

For further information on the subject of Cells, see the articles Histozy, S.B. ; Cell, S.J. ; Tissue, Organs, S.1. (Sharp, in Quain's Elements of Anatomy; Kölliker, Handbook of Human Histology, translated for the Sydenham Society by Huxley and Braek; Carpenter, Manual of Human Physiology; Principles of Physiology: Mohl, On the Vegetable Cell, translated by H.N.; Schleiden, Principles of Scientific Botany, translated by Lkenster; Schleiden, On Phytogenies; Sehman, On the Identity of Structure in Animal and Vegetable Kingdoms, translated for the Sydenham Society; Quack; Lectures on Histology; Hambl, Microscopic Anatomy of the Human Body; Todd and Bown, The Physiological Anatomy and Physiology of Men; Quack, Cautions and Observations in 1851, Wood's Medical College of Surgery, London; Quarterly Journal of Microscopic Science; and Transactions of Microscopic Society, vol. 1.)

CENSUS OF 1851. The Census of Great Britain in 1851 differed in several respects from any previous Census. In some points the range of its inquiries was more minute and precise; in many others wider and more comprehensive. The character of the previous inquiries and the extent to which they reach out have been sufficiently indicated in former volumes of the Penny Cyclopædia. Here, therefore, without giving some of the principal results of the Census, it will be enough to state, in the words of the very elaborate Report of the Registrar-General, prefixed to the volumes of Population Tables, printed by order of Parliament, what the Census of 1851 was about to achieve:

"At the present Census it was resolved to exhibit not merely the statistics, as before, of parishes, and, more completely, of parliamentary and municipal boroughs, but also of many other large towns in England and Scotland as appointed sufficiently important for separate mention, and of all the ecclesiastical districts and new ecclesiastical parishes which, under the provisions of various Acts of Parliament have, during the last forty years, been created in England and Scotland. In addition to the information of occupation, age, and birthplace, of the population, it was determined to ascertain the various relationships (such as husband, wife, son, daughter)—the civil condition (as married, unmarried, widower, or widow)—and the number of persons blind, or deaf and dumb. Further, under the impression that the fifth section of the Act would authorise such an inquiry, the design was formed of collecting statistics as to the amount and distribution of the population in the ten preceding years; the general system of registration of births, deaths, and marriages, which had been for that period in full operation, affording more complete and trustworthy information than that which could be obtained from the population returns of the previous Census."
enumeration books, and other forms, despatched from the central office, exceeded 25 tons. The schedules, after being dispatched to the enumerating officers and superintendent-registers before transmission to the Census Office, there to undergo final revision and generalization. The enumeration of the persons on board vessels, vessels in the navy, and vessels of the Customs, the Admiralty, and the Register of British Seamen; the enumeration of the army by the officers of the various branches, under the direction of the Commander-in-Chief. In these, as in other matters, the returns were much more complete than in the preceding Census, while several collateral returns were at the same time obtained, such as of the latest population of the several colonies, the number of British subjects in various foreign states, the number and rank of half-pay officers of the army, navy, and merchant service of Great Britain and Ireland, officer of the armed service, employed in the civil service of the Crown, &c.

We proceed now to the results of the enumeration of the population. The number of people in Great Britain, including the islands in the British seas, on March 31, 1851, was 20,859,477; and the men in the army, navy, and East India Company's service, abroad, on the passage out, or round the coasts, belonging to Great Britain, on the same day, was 162,490. The total population of Great Britain may therefore be estimated at 20,328,467. Out of England, 1,005,721 in Wales, 2,665,742 in Scotland, 143,126 in the Isle of M., Jersey, Guernsey, Alderney, and other small islands in the British seas; and 162,490 were at sea.

The proportion of males to females has been preserved with remarkable regularity during the half century. In 1801 the male population of Great Britain was 10,386,048, the female 9,940,419; in 1811, 10,386,048 males and 9,940,419 females; in 1821, 10,365,929 males and 9,918,300 females; in 1831, 10,365,929 females to every 100,000 males; in 1841 it was 103,353 females to 100,000 males. At both periods there were somewhat less than 30 males to 31 females. In 1851 there were 20 males at home to 31 females. The excess of births, however, is in the opposite direction. During the three years (1850-51) in which accurate registers of births have been kept, there have been born 3,534,232 males and 3,463,299 females, or about 105 males to every 100 females (104,840 to 100,000). The disparity in the sexes at home is greatest in Scotland—110 females to 100 males; in England and Wales it is only 104 females to 100 males. To what degree the change in the proportions and the subsequent disparity of the numbers in the two sexes is due to emigration, or to a difference in the rate of death from disease and disease to which they are respectively exposed, is the question to consider.

The increase of population in the last half-century nearly reaches the new action equal to that which existed in Great Britain at its commencement, and that notwithstanding the vast numbers who have "annually left the United Kingdom, settled and multiplied in millions in the United States, in the colonies of North America, of Australia, and of South Africa." The aggregate increase in the fifty years is 89,470 per cent., or at the rate of 1,399 per cent. annually. "The annual increase, however, has varied in each decennial period; it increased from 1,374 per cent. on the population in 1801-11, to 1,489 (nearly 12 per cent.) in 1811-21, when it was at its maximum; the annual rate of increase in 1821-31 was 1,406; in 1831-41 it fell to 1,379; and in 1841-51 to 1,186 per cent. annually. The population therefore increases, but the rate of increase has declined since 1811-21, when there was least immigration and most mortality. The rate of increase is still more than it has ever been before or since, down to the last two last decades; when the public health has suffered from epidemics of influenza, cholera, and other diseases; while emigration from the United States has been at an accelerated rate from 974,300 in 1821-31, to 1,098,000 in 1841-51." During the same period the proportion of land to each person has decreased in Great Britain from 9 acres in 1801, to 7 acres in 1841; from 4 acres in the United States and West Indies.

If the rate in which the population has increased since 1801 continued to prevail uniformly, the population would double itself in Great Britain every 62 years; in England and Wales every 51 years.

The number of families in Great Britain in 1801 was 2,960,602; in 1851 it was 4,312,588; being an increase of 2,351,986. The families in England and Wales in 1801 were 1,866,735; in 1851 they were 3,713,990. In Scotland they were 3,044,078 in 1801, and 3,837,151 in 1851. The average number of families to a house in Great Britain in 1801 was 1.209; and of persons in a family, 4.645; in 1851 there were 1.182 families to a house, and 4.582 persons in a family. In Scotland in 1801 the average of persons in a family was 4.614; in 1851, 4.572; and in the Channel Islands, 1.600. The average number of families in a house was somewhat higher—1.621. In Glasgow the number of families to a house is 5.4; of persons to a house, 27.5; in Edinburgh the corresponding numbers are 4.2 and 20.6; in Aberdeen, 3.2 and 20.2; in Dundee, 2.2 and 17.6; in Perth, 2.6 and 12. In London, on the other hand, the number are only about the average of Scotland—1.74 and 7.7; but in some districts they are as high as 10, 11, and even 15 persons to a house. This excess in the northern cities was caused by a real difference in the habits of the people. "The towns and cities of the two northern English counties and of Scotland are built in the continental style; and the families of the middle classes, as well as the poor, live in large flats, which constitute separate tenements. The term house, in many parts of Scotland, has been usually applied to these several flats or floors; and in every census from 1801 to 1841 'flats' in Glasgow and some other Scottish towns were returned as separate houses. In 1851 this was corrected, and the enumerators were instructed that flats and similar buildings were to be returned as houses. The returns from Scotland, as from England, are now, therefore, made on a tolerably uniform principle, and are fairly available for comparison. The variations in the several English counties and in different districts with respect to the proportion of families to houses, is considerable; but it would require far more space than we can spare to enter upon it. As a rule, in England and Wales, a house is inhabited by one family, the excess in the proportion being mainly caused by the large number of public institutions, such as lodging-houses, &c. The following is an analysis of the families in connexion with the houses which they occupy in 14 subdistricts of England, containing 35,876 inhabited houses, in which were 38,968 families (1,600 of the houses having the families absent), comprising 242,164 persons, on an average, nearly 7 persons to a house—5 to a family. Of these houses, 36,300 contained one family; 4,789, two families; 1,023, three; 745, four; 432, five; 252, six; 113, seven; 62, eight; 38, nine; and 30, ten families and upwards. This analysis is in the Report carried out with great minuteness into a variety of particularities, but which it is impossible for us here to follow. The number of houses in Great Britain in 1851 was—inahebitated, 3,670,193; unoccupied, 166,725; building, 29,104. In 1801 there were 1,828,476 inhabited, and 67,320 uninhabited; the number building was not returned. The following tables (1) the number of principal parish institutions, of those inns which 30,316 were officers and servants; and (2) the number of persons sleeping in barges, barns, tents, and vessels.
in one instance that a tribe of gipsies struck their tents and
paused into another parish in order to escape enumeration.
In 1841 the number of the houseless class was 52,303 : owing
to the more advanced period of the year (June 7) at which
the Census was taken, and the absence of many Irish people and labouers
were then engaged in the hay harvest."

From houses and families we ascend to towns and corpora-
tions.
No attempt was made to classify the smaller aggre-
gates of houses by defining villages, hamlets, &c.; but 17,150
places were named as towns in the Great Britain
in the Population Tables, and each of these is assumed to
be a village, or an aggregation of families round a church or
chapel; on an average these villages lie at a distance of
about 8 miles apart, so that the inhabitants of the country
average 32 persons to the square mile; and the average limit of 1 mile from the centre, or at the mean
distance of six-sevenths of a mile.

"Great Britain has eighty and fifteen towns of various
magnitudes, 13,006, or Great towns, containing
a city, five hundred and eighty in England and Wales; two
hundred and twenty-five in Scotland, and ten in the Channel
Islands. To 21 of the preceding 'villages' there is on
an average a town, which stands in the midst of 110 square
miles of country, containing a hundred and sixty persons by
side, a circle having a radius of nearly 6 miles; so that
the population of the country around is, on an average, 4
miles from the centre.

The population amounted to 10,586,888 in the 815
towns containing 3,184 miles of area. An average
town of 19,933 inhabitants stands on an area of nearly 4
square miles; equivalent to a square of 3 miles to the side,
a circle 1.5 miles to a radian, and the population is less than
three-quarters of a mile from the centre.

The average area of the towns of Great Britain was
10,430,189; consequently if, for the sake of distinction, the
detached houses, the villages, and small towns without
markets, are called—country; at the present time the town
classification of Great Britain differs little from the
numbers, that they may be considered equal, for by the
abstracts 10,566,888 people live in the towns, and 10,430,189
in the country. In the towns there were 32 persons to as
acre, in the country 63 acres to a person. The density in the
country was therefore a smaller one, in the towns 3,527 persons—
to a square mile.

The 815 towns are grouped around 87 county
towns—Edinburgh, London, in England and Scotland, and 3 chief towns, equivalent
to county towns, in the Islands of the British Seas. Each of
these towns is a capital of some county, and may be
considered the port of trade for a hundred miles on
the whole, and is generally the residence of a great
manufacturing city.

The equality of proportion between the town and country
population of Great Britain is one of the 'great facts',
which brought into prominent notice by the Census of 1851.
The great relative increase of the population collected in
the principal towns is another of the most important facts which
point to a change in the habits and condition of the people.

Thus, in the 61 principal towns in the England and Wales,
which in 1801 contained 2,133,388 inhabitants, the
population had risen in 1851 to 6,594,521; in other words, in
England and Wales the population of Great Britain included
those 61 towns, while in 1851 very nearly 35 per cent.
of the population resided in the same towns. In the seven
principal towns in Scotland there resided in 1801, 571,490
of the entire population of Great Britain, while in 1851,
776,696 out of the entire population of 2,888,742,
or 26.9 per cent.; or there occurred a relative increase in
the 68 largest towns in Great Britain of upwards of 10 per cent.,
as compared with the increase of the entire population; that
is, in the proportion of 68 out of the 61 towns in Great Britain
resided in 68 of the principal towns, now three out of every
ten persons reside in them. The increase of the population
of London and the other great towns was 4,609,332, or 189
per cent. in the half-century; that of the smaller towns and
villages was 387, or 17.5 per cent. The actual increase in some of the great towns was very remark-

able. In London the population increased from 956,883 to
3,269,826, being an increase of 1,403,973, or 146 per cent.;
Manchester (with Salford) from 947,786 to 401,336; Liverpool
from 83,959 to 375,585, its opposite neighbour Birken-
head rising in the same time from 110 to 24,386; Bir-
kirk from 27,070 to 94,941; Preston from 16,174 to
96,848; Bradford from 13,764 to 107,778; Plymouth
from 16,040 to 32,821; Southampton from 7,913 to
35,305; Merthyr-Tydyl from 10,127 to 63,080; Glasgow from
77,038 to 328,007; and other manufacturing, mining, and sea-port
towns, the increase of inhabitants in the population of the waterings-places, or towns chiefly devoted to trade,
meanwhile being at least commensurate with that of the towns devoted to business: thus Brighton increased from
7,440 in 1801 to 69,673 in 1851; and Cheltenham from
12,776 to 35,361 in the same period.

Dividing the towns into classes, it appears that "the
greatest part (3,029,776) of the increase (5,363,650) of
the classes of towns was in London and in the manufacturing
towns; the (1) sea-ports, the (2) towns which are in mining
districts, or are engaged in hardware manufactures, and the
(3) county towns, severally contributed more than three-
quaters of a million to the increase; the increase of the people living in watering-places was 200,164. In the latter
class the greatest was the rise in the Channel towns; it was 3.961 per cent. annually. The annual rate of increase
in the manufacturing towns, 3.336 in the mining and hardware
towns, 2.191 in the sea-ports, 1.890 in London, and 1.809 in the county towns. The annual rate of increase in Great
Britain in the half-century was 2.677. The towns have increased most rapidly in which straw-plait, cotton,
pottery, and iron are manufactured.

The density and proximity of the population are elucidated
in the Report and the Summary Tables in various ways, and
may be considered at this stage as sufficiently treated
briefly. The density of population, or, as a recent French authority (Baron de Prony in the 'Annaire') has
proposed to term it, 'the specific population,' after the
methodology of 'Prony,' is given for the 964 districts of
England and Wales, from 155,761 persons per square mile
in the East London district, to 18 on a square mile in
that of Bellingham, Northumberland. The greatest density
of population out of London is in the Liverpool district,
which is 74,446, and the next Birmingham, which is 41,853
on a square mile. Manchester has 11,577, which is less than
Leeds, which has 30,886; Bristol, which has 22,586; Plymouth,
which has 30,441; Nottingham, which has 19,094;
East Stonehouse, which has 10,913; Brighton, which has
19,085; Hail, which has 17,750; Salisbury, which has
11,907; Greenwich, which has 11,849; and Exeter, which
has 11,670. The smaller density of Manchester than such
towns as Salisbury and Exeter is accounted for, in a great
measure, by the large spaces covered by the numerous
great factories and workshops; and any great town, whose
spread would be generally expected, especially as both Exeter
and Salisbury are cathedral towns, having considerable open
spaces within the city boundaries. But the evidence of
over-crowding in those cases is diminished by the fact
that they are compared with some of the other most populous
manufacturing towns: Sheffield, for instance, which is among
the densest, has 6,863, or little more than half as many on
the square mile as Salisbury; Bradford, which has 2,887,
or less than one-fourth; and Blackburn, which has 1,393,
or only one eighth. As respects proximity of population,
regarding it upon the same hypothesis of equal distribution,
we find that the people of England were, in 1801, on an
average 153 yards a seader, while in 1851 they were only
108 yards a seader, which is a great advance. In 1801 there
were 628,262 yards, and 292 yards in 1851. Or, as it
may be otherwise expressed, on the same area the population
has doubled; the proximity has increased—the separation
less than a fifth part of 3.849 per cent.; but of course
the mean proximity has increased from 21 yards in 1801
to 14 yards in 1851.

The Islands of the British Seas are noticed more fully in
this than any previous Census. Five hundred islands and
rocks have been enumerated by the census takers; these were
found on the morning of March 31st, 1851 on 175 islands, or
groups of islands. Some of the others are, however,
ocassionally dwelt on by shepherds during summer. Passing
grey Ireland, the Census of Great Britain has been defended to
that four of the larger islands or groups of wards of 50,000
inhabitants—Anglesey 67,318, Jersey 57,020, Isle of Man
89,344, Isle of Wight 60,264. Four others have each above
20,000 — Guernsey 29,757, Lewis 28,918, Skye 31,589, and Shetland 20,936. Two more number upwards of 10,000 — Orkney 16,665, and Islay 12,534. Twenty number between 1,000 and 10,000 inhabitants; fifteen between 500 and 1,000; thirty-seven between 100 and 500; fifteen between 50 and 100; forty-five between 10 and 50; seven number 10 inhabitants on each; and twenty-five under 10, two of whom having only one inhabitant on each, Little Papa, one of the Shetlands, a woman, and Inchcolm, in Fife, a man. Some of the more remote and smaller islands were now numbered for the first time, and much curious information has been collected. St. Kilda, one of the Hebrides, 70 miles from the mainland, is one of these. The population, now for the first time officially enumerated, consisted of 48 males and 69 females, of whom 25 were on board a vessel, and the remainder, except one female, aged 35, who was imported from Sutherlandshire. The excess of females is chiefly among children under 20, of which there are 32 males and 30 females; and persons above 60, of whom 6 are females and 1 only is a male. The men are all farmers and bird-catchers, each "farmer" occupying about three acres of land. Eight females are described as "weavers in wool." The great majority of children die of what is called the "eight days' illness;" several were born during the previous twelve months, but only two were living. There are a manse and a church on the island; but no resident clergyman or medical man.

The number of boroughs in England and Wales having municipal organisation according to the Municipal Reform Act, was 186, with a population of 4,348,369; of the remoter boroughs 18 have had charters of incorporation granted since the passing of that Act. There are 89 unreformed boroughs. Of the reformed boroughs it is found that one-half of the population (2,293,542) is contained in 17 boroughs, each of which contains more than 60,000 inhabitants. It appears that 102 boroughs, or more than half of the total number, contain less than 9,000 inhabitants in each; in the aggregate, 472,610 inhabitants. Eighty-seven boroughs have from 2,000 to 7,000 inhabitants; twenty-seven, from 500 to 40,000; one, from 40,000 to 60,000; seven, from 60,000 to 80,000; two, from 80,000 to 100,000; and three have 200,000 and upwards.

The 83 royal and municipal boroughs of Scotland contained 775,777 inhabitants; only three boroughs contained more than 60,000 inhabitants; one, more than 40,000; three, from 20,000 to 40,000; fifteen, from 7,000 to 20,000; thirty-three, from 2,000 to 7,000; and twenty-eight under 2,000 inhabitants.

Several of the most populous and important places in England and Wales are still without a municipal organisation. Among these are the metropolitan parliamentary boroughs of the Tower Hamlets, population 639,111; Finchley, 325,729; Marylebone, 370,597; Greenwich, 103,764; Lambeth, 231,349; and Westminster, 241,611, and the towns of Brighton, population, 69,673; Burton, 30,626; Bury, 31,262; Chatham, 28,424; Cheltenham, 35,061; Dudley, 37,960; Huddersfield, 30,800; Merton, 32,863; Rochdale, 29,196; Stirling, 36,595; and Stoke-upon-Trent, 84,027.

In Scotland there are no towns containing a population of 10,000 which are not municipal boroughs. Additional abstracts, of a very valuable character, have been published subsequently to the General Report relating "to the ages, occupation, civil condition, and birth-places of the population; the numbers of the blind, and of the deaf and dumb; and the extent of the accommodation throughout the country for the purposes of education and religion;" but this is not the place to go into questions of so wide a nature. In another article will be found a notice of the Occupations of town Populs [2. 2] as exhibited in the Census returns.

With respect to Ireland, the circumstances brought out with most startling prominence was the remarkable decrease in the population since the previous Census. Up to that of 1841, each decennial Census of the half-century had shown a steady if not rapid increase of the population. That of 1851 showed that during the past ten years the gain of the previous twenty had been more than undone. In 1841 the total population of Ireland was 6,501,897; in 1851 it was only 6,551,970. And the returns further showed that this decrease was greatest in the rural districts. The population of towns, as compared with 1841, the only exceptions were some two or three places in Ulster, in each of which, from causes easily understood, there had been a continuous increase of inhabitants during the half century. The large falling off of the population between 1841 and 1851 was mainly owing to the disasters famine which afflicted Ireland in 1845-47, in consequence of the failure of the potato crop; partly, however, it was due to emigration, which, in its turn, had been greatly stimulated by the failure of the potato, and the consequent agricultural distress. The total emigration from Ireland during the ten years between 1841 and 1851 is estimated to have amounted to 1,589,138, "varying with considerable regularity according to the variations in the state of the labouring classes." For the return showing in one view the increase and decrease of the population of Ireland, we append a table of the number of inhabitants in the four provinces at each decennial Census from 1821 to 1851.

<table>
<thead>
<tr>
<th>Province</th>
<th>1801</th>
<th>1811</th>
<th>1821</th>
<th>1831</th>
<th>1841</th>
<th>1851</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leinster</td>
<td>1,672,889</td>
<td>1,670,731</td>
<td>1,799,113</td>
<td>1,973,731</td>
<td>2,133,731</td>
<td>2,133,731</td>
</tr>
<tr>
<td>Munster</td>
<td>5,684,579</td>
<td>5,551,613</td>
<td>2,217,152</td>
<td>2,386,796</td>
<td>2,186,142</td>
<td>2,186,142</td>
</tr>
<tr>
<td>Ulster</td>
<td>3,942,043</td>
<td>3,443,279</td>
<td>2,334,914</td>
<td>2,148,893</td>
<td>1,108,211</td>
<td>1,108,211</td>
</tr>
<tr>
<td>Connaught</td>
<td>20,608,271</td>
<td>2,601,897</td>
<td>7,767,401</td>
<td>1,876,224</td>
<td>2,531,370</td>
<td>2,531,370</td>
</tr>
</tbody>
</table>

The reduction of population was as might be expected most marked in the rural districts. In several of the large towns the Census of 1851 showed an actual increase of population, while scarce any showed a falling off, a circumstance arising no doubt from the farming poor having crowded into them in the hope of obtaining employment or of finding relief. Dublin city, which in 1851 contained 165,681 inhabitants, had 252,726 in 1841, and 253,971 in 1851. Certainly, though it showed a decline of nearly 16,000 between 1821 and 1831, and an increase of above a thousand from 1841. Belfast had more than doubled in population between 1821 and 1841, and between 1841 and 1851 had increased from 76,308 to 100,300. Galway town, which between 1831 and 1841 and 1851 had fallen in population from 33,190 to 17,257 had increased in 1851 to 23,696.

The two following tables will show in the readiest manner the general results of the enumeration of 1851.

<p>| Area, House, and Population, on March 31st, 1851. |
|----------------|----------------|----------------|----------------|----------------|----------------|</p>
<table>
<thead>
<tr>
<th>Area in Acres</th>
<th>Inhabited</th>
<th>Uninhabited</th>
<th>Building</th>
<th>Persons</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Great Britain and the British Islands in the Sea.</td>
<td>57,624,977</td>
<td>5,670,192</td>
<td>166,755</td>
<td>29,194</td>
<td>29,599,477</td>
<td>10,723,558</td>
</tr>
<tr>
<td>England and Wales</td>
<td>37,324,915</td>
<td>3,278,639</td>
<td>153,494</td>
<td>26,971</td>
<td>7,97,025</td>
<td>6,711,295</td>
</tr>
<tr>
<td>Scotland</td>
<td>20,047,462</td>
<td>370,308</td>
<td>12,146</td>
<td>2,420</td>
<td>2,882,745</td>
<td>1,375,479</td>
</tr>
<tr>
<td>Ireland</td>
<td>29,086,571</td>
<td>1,047,335</td>
<td>65,159</td>
<td>2,119</td>
<td>3,611,974</td>
<td>2,176,727</td>
</tr>
<tr>
<td>Great Britain and the Islands in the British Seas.</td>
<td>232,000</td>
<td>21,845</td>
<td>1,620</td>
<td>203</td>
<td>143,129</td>
<td>66,854</td>
</tr>
</tbody>
</table>
In the article Great Britain of the 'Penny Cyclopedia' a table is given of the population of the counties of England, Wales, and Scotland, with the areas in square miles, according to the Census of 1861, and under the head Ireland a similar table is given for that island. In the former Supplement, under the head Counties, are given the population of the counties of Great Britain and Ireland, according to the Census of 1841. We now give tables of the population of Great Britain and Ireland, with the areas in acres, according to the Census of 1851, followed by a list of towns in Great Britain and Ireland, arranged under their respective counties, with the population of each in 1851.

<table>
<thead>
<tr>
<th>Counties</th>
<th>Acres</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bedfordshire</td>
<td>295,582</td>
<td>124,478</td>
</tr>
<tr>
<td>Berkshire</td>
<td>460,338</td>
<td>170,065</td>
</tr>
<tr>
<td>Buckinghamshire</td>
<td>464,930</td>
<td>165,723</td>
</tr>
<tr>
<td>Cambridgeshire</td>
<td>337,848</td>
<td>166,435</td>
</tr>
<tr>
<td>Chesire</td>
<td>707,676</td>
<td>454,725</td>
</tr>
<tr>
<td>Cornwall</td>
<td>873,600</td>
<td>355,558</td>
</tr>
<tr>
<td>Cumberland</td>
<td>1,001,278</td>
<td>195,442</td>
</tr>
<tr>
<td>Derbyshire</td>
<td>658,903</td>
<td>296,049</td>
</tr>
<tr>
<td>Devonshire</td>
<td>1,645,794</td>
<td>576,088</td>
</tr>
<tr>
<td>Dorsetshire</td>
<td>652,025</td>
<td>184,707</td>
</tr>
<tr>
<td>Durham</td>
<td>692,476</td>
<td>309,207</td>
</tr>
<tr>
<td>Essex</td>
<td>1,052,105</td>
<td>309,375</td>
</tr>
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<td>Gloucestershire</td>
<td>803,102</td>
<td>468,903</td>
</tr>
<tr>
<td>Hampshire</td>
<td>1,073,216</td>
<td>466,370</td>
</tr>
<tr>
<td>Herefordshire</td>
<td>555,000</td>
<td>115,089</td>
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<td>Hertfordshire</td>
<td>391,141</td>
<td>167,298</td>
</tr>
<tr>
<td>Huntingdonshire</td>
<td>230,665</td>
<td>64,183</td>
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<td>Kent</td>
<td>1,041,415</td>
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<tr>
<td>Lancashire</td>
<td>1,219,181</td>
<td>2,691,236</td>
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<td>Leicester</td>
<td>514,164</td>
<td>230,308</td>
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<td>Lincolnshire</td>
<td>1,775,198</td>
<td>407,222</td>
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<td>Middlesex</td>
<td>169,186</td>
<td>1,886,676</td>
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<tr>
<td>Norfolk</td>
<td>1,364,301</td>
<td>442,714</td>
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<td>636,355</td>
<td>212,369</td>
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<td>Oxfordshire</td>
<td>472,887</td>
<td>197,439</td>
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<td>Rutlandshire</td>
<td>90,514</td>
<td>22,983</td>
</tr>
<tr>
<td>Shropshire</td>
<td>826,055</td>
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</tr>
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<td>728,406</td>
<td>600,716</td>
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<td>256,425</td>
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<tr>
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<td>638,092</td>
</tr>
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</tr>
<tr>
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</tr>
<tr>
<td>Yorkshire, West Riding</td>
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<td>324,455</td>
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<tr>
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<td>193,453</td>
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<td>65,474</td>
</tr>
<tr>
<td>Cardiganshire</td>
<td>443,397</td>
<td>70,716</td>
</tr>
<tr>
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<td>110,622</td>
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<td>87,870</td>
</tr>
<tr>
<td>Denbighshire</td>
<td>22,983</td>
<td>22,983</td>
</tr>
<tr>
<td>Flintshire</td>
<td>164,905</td>
<td>68,185</td>
</tr>
<tr>
<td>Glamorganshire</td>
<td>347,494</td>
<td>231,549</td>
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<tr>
<td>Merionethshire</td>
<td>382,291</td>
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</table>

<table>
<thead>
<tr>
<th>Counties</th>
<th>Acres</th>
<th>Population</th>
</tr>
</thead>
<tbody>
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<td>Montgomeryshire</td>
<td>483,523</td>
<td>67,335</td>
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<tr>
<td>Pembroke</td>
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<td>94,140</td>
</tr>
<tr>
<td>Radnorshire</td>
<td>272,128</td>
<td>24,716</td>
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<table>
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<th>SCOTLAND</th>
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</thead>
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<td>2,083,125</td>
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<td>108,598</td>
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<tr>
<td>Caithness</td>
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</tr>
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<td>22,651</td>
</tr>
<tr>
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</tr>
<tr>
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<td>205,673</td>
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<td>298,355</td>
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<tr>
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<td>38,559</td>
</tr>
<tr>
<td>Fife</td>
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<td>153,546</td>
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<td>566,720</td>
<td>34,627</td>
</tr>
<tr>
<td>Haddingtonshire</td>
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<td>38,956</td>
</tr>
<tr>
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<td>2,723,501</td>
<td>96,500</td>
</tr>
<tr>
<td>Kinross</td>
<td>262,214</td>
<td>43,598</td>
</tr>
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<td>49,231</td>
<td>8,924</td>
</tr>
<tr>
<td>Lanarkshire</td>
<td>610,724</td>
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</tr>
<tr>
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<td>631,719</td>
<td>305,169</td>
</tr>
<tr>
<td>Linlithgowshire</td>
<td>624,737</td>
<td>39,235</td>
</tr>
<tr>
<td>Nairnshire</td>
<td>137,590</td>
<td>9,596</td>
</tr>
<tr>
<td>Orkney and Shetland</td>
<td>298,873</td>
<td>82,683</td>
</tr>
<tr>
<td>Peebles</td>
<td>226,460</td>
<td>167,308</td>
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<td>Renfrew</td>
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<td>161,091</td>
</tr>
<tr>
<td>Ross and Cromarty</td>
<td>2,018,373</td>
<td>87,507</td>
</tr>
<tr>
<td>Roxburghshire</td>
<td>450,939</td>
<td>81,642</td>
</tr>
<tr>
<td>Selkirkshire</td>
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<td>9,009</td>
</tr>
<tr>
<td>Stirlingshire</td>
<td>295,875</td>
<td>86,037</td>
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<tr>
<td>Sutherlandshire</td>
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<td>52,793</td>
</tr>
<tr>
<td>Wigtownshire</td>
<td>295,736</td>
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<table>
<thead>
<tr>
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<th></th>
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</tr>
</thead>
<tbody>
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<td>221,342</td>
<td>69,059</td>
</tr>
<tr>
<td>Dublin</td>
<td>208,714</td>
<td>166,731</td>
</tr>
<tr>
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<td>5,760</td>
<td>258,261</td>
</tr>
<tr>
<td>Kildare</td>
<td>418,430</td>
<td>29,988</td>
</tr>
<tr>
<td>Kilkenny</td>
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<td>136,773</td>
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<td>19,973</td>
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<td>82,959</td>
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<tr>
<td>Louth</td>
<td>201,434</td>
<td>90,812</td>
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<tr>
<td>Drogheda</td>
<td>356,478</td>
<td>16,854</td>
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<tr>
<td>Meath</td>
<td>570,120</td>
<td>118,735</td>
</tr>
<tr>
<td>Queen's County</td>
<td>424,844</td>
<td>111,923</td>
</tr>
<tr>
<td>Westmeath</td>
<td>433,466</td>
<td>111,409</td>
</tr>
<tr>
<td>Wexford</td>
<td>576,888</td>
<td>100,139</td>
</tr>
<tr>
<td>Wicklow</td>
<td>400,176</td>
<td>99,798</td>
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</table>

<table>
<thead>
<tr>
<th>Munster</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Clare</td>
<td>721,394</td>
<td>212,429</td>
</tr>
<tr>
<td>Cork</td>
<td>1,842,603</td>
<td>58,126</td>
</tr>
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<td>Cork city</td>
<td>2,633</td>
<td>58,745</td>
</tr>
<tr>
<td>Kerry</td>
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<td>238,339</td>
</tr>
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<td>Limerick</td>
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</tr>
<tr>
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<td>191,544</td>
</tr>
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<tr>
<td>Waterford</td>
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</tr>
<tr>
<td>Waterford city</td>
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<td>25,997</td>
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</thead>
<tbody>
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<td>Antrim</td>
<td>743,931</td>
<td>251,831</td>
</tr>
<tr>
<td>Bellag</td>
<td>1,972</td>
<td>100,900</td>
</tr>
<tr>
<td>Carrickfergus</td>
<td>15,700</td>
<td>15,700</td>
</tr>
</tbody>
</table>
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CEN

116
Stockport, P.B.

Cavan
Donegal

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196,085
174,071
255,160

328,076
477,360
1,193,443
611,919
457,195
518 695
319,757
806,640

A™«gl>
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Down
Fermanagh
Londonderry
Monaghan
Tyrone
Connaught :
Galway
Galway toim

320 817
116,007
191,868
141,813
265,734

298,136
23,695
111,841
274,612
173,417
128,510

1,665,726

628
392,363

Mayo
Roscommon

1,363,882
607,691

461,753

Sligo

ISLANDS IN THE BRITISH SEAS :—
I tie

of

4488

Altringham
Birkenhead
Chester
.

M.B.

Congleton,

Man

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52,387
57,020
29,757

180,000
40,000

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Ialand of Jersey
Island of Guernsey.

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....
....

Islands adjacent to Guernsey

Aldemey

Hcrm

Jethou
Le Marchant
Great and Little Serk

.

3,333

46

32,000

3

580

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Crewe
Frodsham

the towns generally contain a popu
lation of 2000 and upwards, but several are also inserted
which have a smaller population. The Parliamentary Boroughs are placed first ; then follows the list of the towns,
including the parliamentary boroughs, which are in many
instances also Municipal Boroughs, having*a population
The
different from that of the Parliamentary Boroughs.
Burghs and Contributory Burghs of Scotland are arranged
under their respective counties, but a list of the Parliamentary Districts of Burghs is given at the end of the list
for Scotland.
The abbreviation P.B. signifies Parliamentary Borough ;
C. P. B., Contributory Parliamentary Borough ; M. B., Municipal Borough, and includes the Scotch Royal Burghs.
Sometimes p. and t. are inserted in the figure-column, and
signify Parish and Township, where the returns of the
census do not state the population of the town itself.

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4491
2099

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Hyde

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10,051

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3127

Knutsford

39,048

M.B.

Macclesfield,

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•

p.
p.

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Stalybridge
Stockport, M.B.
Tarporley .

Tranmere

Ashburton
Axminster

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Crediton

6337
7328
6005
6204
13,656

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Truro, P.B.

9872
10,733

.

list,

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Bodmin, M.B.
Callington

.

p.

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Cam bourne
about
Camelford
Falmouth, M.B.
Germans, St.

p.

M.B. .
Ives, St., M.B.
Launceston, M.B.
Liskeard, M.B.
Penryn, M.B. .
Helston,

.

Penzance,

M. B.

Redruth

.

Truro,

M.B.

3565
4327
2146
6547
900
4963
2967
3355
6525
8397
4386
3959
9214
7095

10,733

CUMBERLAND.
26,310

Wycombe, High, P. 5.

7179

COCKERMOUTH, P.B.
Whitehaven, P.B.

Amersham

2093

Alston

6081
1684

Brampton

7275

11,693

Aylesbury
Ampthill

.

3976
3589
1083
4465

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10,648

1922
1052
2438
2049

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Toddington

Woburn

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Harrold
Leighton Buzzard
Luton
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Potton .
.

Sbefford

1961
11,693

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Bedford, MJB.
Biggleswade
Dunstable
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Abingdon, P.B. .
Readino, P.B. .
Wallingforu, P.B.
Windsor, P.B.

5954

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21,456
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8064
9596

.

Beaconsfield

Buckingham, M.B.

Chesham
Eton .
Iver

4020
2496
3666
1985
4485
3312
2265
2317
2000
1757
1937
1889
2070
3588

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Marlow, Great
Newport Pagnell

Olney

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Prince's Risborough
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Slough
about
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Stony Stratford

Wendover
Winslow

BERKSHIRE

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Wolverton

Wycombe, High, M.B.

Abingdon,

M.B.

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Farringdon, Great

Hungerford
Lam bourn
Maidenhead,

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M.B.
Newbury, M.B.
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Reading, M.B. .
Wallingford, M.B.
Wantage

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21,456
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Windsor, M.B.

Wokingham

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5954
2456
2255
1258
8607
6574

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2819
2951
9596
2272

Aylesbury, P.B . .
Buckingham, P.B.
Marlow, Great, .P.B.
.

26,794

8069
6523

M.B.

Cockermouth
Egremont .
Keswick
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Longtown .
Maryport
Penrith

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26,310

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p.

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Whitehaven
Wigton
Workington

Cambridge, P.B.

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27,815

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Cambridge Unit.,
P.B.

18,916

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4244
5837

Cambridge,

Ely

MM.

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27,815

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Linton

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March
Thorney
Upwell

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Soham

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6176
2061
4171
2766
2174
2091
5472
10,594

CHESHIRE.
Chester, P.B.

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Macclesfield, P.B.

.

27,766
39,048

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Exniouth

.

2671

.

38,180
.

82,818

.

6123
3427
2919
4482

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Honiton, M.B.
.
Ilfracombe
South Molton, M. B.,
.

Newton Abbot

3147
2534

.

Ottery St, Mary

.

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Plymouth, M. B.
Sidmouth •
•

52,221

2616
8086

Tavistock

5013

Teignmouth

M. B.

Topsham
Torquay

11,144

.

2717

.

7903

M.

Torrington,

3308

B.

M. B.

Totnes,

4919

DORSETSHIRE
Bridport, P. B.
Dorchester, P. B.
Lyme Regis, P. B.
Poole, P. B.
Shaftesbury, P. B.

7666
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6394

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3516

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9255

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9404

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7218

Melcombr Regis, P£.

9458

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Wareham, P.B.

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Weymouth and

Beaminater

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M. B.

Blandford,

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M. B.
Dorchester, M. B.
Lyme Regis, M. B.

2504

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7566

Bridport,

Poole, M.B.
Shaftesbury, M.

Sherborne
Sturminster

6394
2661

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S255
2503

B.

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3878

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2014

1916

Wareham .
Weymouth, ice M.B.
Wimbourne

7218
9458

40,609

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10,082

M. B.

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Derby,

M. B.

Melbourne
Wirksworth

7101

t.2562

Crich

.

40,609

.
.

.

13,188

Gateshead, P. B.
South Shields, P. B.
Sunderland, P. B.

25,568

t.

2469
2227
2632

67,394

4357

Barnard Castle
Bishop Auckland
Darlington

4400

.

.

11,228

Durham, M. B.

13,188

Gateshead, if. B.

25,568

M. B.

9503

Hartlepool,

3224

Hough ton-le-Spring

M.

B.
.

Stockton, M. B.
Sunderland, M. B.

28.974
t.

2545
1867

63,897

ESSEX.
Colchester, P. B.
Harwich, P. B. .
Maldon, P. B. .
Barking

.

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Braintree

'.

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Brentwood

DEVONSHIRE.
Ashburton, P. B.
Barnstaple, P. B.
Dartmouth, P. B.
Devomport, P. B.
Exeter, P. B. .
Homitom, P. B. .
Plymouth, P. B.
Tavistock, P. B. .
Tiverton, P. B.
Totnes, P. B.

28,974

1800
2418

abont

Alfreton

Durham, P. B.

South Shields,
8tanhope
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DERBYSHIRE.
Derby, P. B.

Dronfield

.

7275
2049
2618
2142
5698
6668

.

.

Chesterfield,

Whittlesey
Wisbeach, M.B.

BUCKINGHAMSHIRE

Carlisle,

Belper

SHIRE.

.

6775
5627
2765
3934
4i08

DURHAM.
2005
3074

Ashbourne

CAMBRIDGE-

.

11,371

18,916

SHIRE.
Bedford, P.B.

.

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Swanage
Carlisle, P.B.

ENGLAND.
BEDFORD-

Austell, St.

.

Devonport, M. B.
Exeter, M.B.

CORNWALL.

PM.

.

M. B.

Dartmouth,
Dawlish

Tiverton,

Bodmin, P.B. .
Helston, P.B.
Laurcbston, P.B.
LlSKEARD, P.B.
Penryn and Fal
MOUTH, P.B.

.

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Collumpton

2632
6519

p.

3482
2769

r.

.

p.

Brixham

20,760
53,835

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.

Barnstaple, M.B.
Bideford, M. B.

1235
5426
1377
3167
8049
2752

p.

.

Nantwich
Northwich
Over
Runcorn .
Sandbach

St. Ives,

In the following

24,285
27,766
10,520

.

Middlcwich

Leitrim

53,835

.

Population.

Acres*

Counties*

.

.

.

.

Chelmsford

3432
11,371

4508
50,159
40,688

3427
52,221

8086
11,144

4419

Digitized by

Coggleshall
Colchester,

19,443

4451

5888

4930
2836
2205
6033
3484
19,443

M. B.

Epping

1821

Halsted
Harwich,

5628
4451

M. B.

Maldon, M. B.
Romford .
Saffron Walden,
Stratford

.

M.B

Google

3791
5911
10,586

.

Waltham Abbey

4558

.

3329


<table>
<thead>
<tr>
<th>CEN</th>
<th>119</th>
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<tbody>
<tr>
<td>Milford, C.P.B.</td>
<td>2837</td>
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<tr>
<td>Narbeth, C.P.B.</td>
<td>1392</td>
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<tr>
<td>Tenby, C.P.B. M.B.</td>
<td>10107</td>
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<tr>
<td>Kenfig, C.P.B. M.B.</td>
<td>2568</td>
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<td>Cefnly, C.P.B.</td>
<td>774</td>
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<td>KNIGHTON, C.P.B.</td>
<td>1358</td>
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<td>Oswestry, C.P.B.</td>
<td>714</td>
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<td>Radyr, C.P.B.</td>
<td>1007</td>
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<td>Carnarvon, C.P.B.</td>
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<td>1610</td>
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<td>1436</td>
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<td>Oxford, C.P.B.</td>
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<td>Cambridge, C.P.B.</td>
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<td>2267</td>
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<td>St Albans, C.P.B.</td>
<td>498</td>
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<tr>
<td>Reading, C.P.B.</td>
<td>3787</td>
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<td>Wallingford, C.P.B.</td>
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however a very different thing from the true Beldillum. 

CEDRO, a genus of plants belonging to the natural order Cunoniifera. It is characterised by its sepals being very numerous, imbricate, adnate to the base of the ovum, united into an elongated tube, one outer shorter and like a calyx, middle ones longer and coloured, innermost ones petaloid; the style thickened at the apex; the berry annual, the fruit a fusiform capsule. The species are feby pinnate shrubs, with a woody axis and soft interior. They possess angles which are vertical and covered with teeth of spines. The flowers are large, arising from the angles of the fronds, white or yellowish, petaloid, the sepals ovate. C. emilia, the Old Man Torre-Thistle, is an erect plant, bearing a stem with 20-25 vertical ribs, covered with fascicles of bristles, each fascicle containing from 15-20 radiating armed curved bristles. Its long gray bristles give it the appearance of the head of an old gray-haired man. It is a native of Mexico. C. flagellaris, the Creeping Cereus, has prostrate stems with about 10 angles. It is very common in our gardens, and its trailing stems furnish support of trellis-work. It is a native of South America, though now naturalized in Asia and Africa. C. grandiflorus, the Night-Flowering Cereus, has rooting stems, 5 or 6 angles and fascicles, with bristles in each fascicle. It is a native of the West India Islands, and is found in many parts of the mainland of South America. This plant when cultivated produces very large beautiful sweet-scented flowers. They are however of short duration. The plant was called the "beauty of the West," and the flowers were used for perfume. He was of opinion too, that by devoting a day or two each week to the preparation of his sermons and to official clerical acts, a clergyman could amply discharge all his proper duties, so as to have the rest of his time at his disposal for whatever other occupations interested him. He carried this view into practice. During the first year of his incumbency he varied his professional work at Kilmany by courses of lectures on mathematics and chemistry at St. Andrews. His reference to the physicist, and for natural science over theology was indicated by his being candidate in 1804 for the chair of Natural Philosophy at St. Andrews. With even less success of advantage he offered himself in the following year as a candidate for the mathematical chair at the University of St. Andrews. Mr. Leslie, afterwards Sir John Leslie, obtained the post, and it was with reference to an argument in Leslie's favour urged at the time by Playfair, to the effect that "the vigorous prosecution of mathematical or natural science was incompatible with clerical duties and habita" that Mr. Chalmers made his first literary appearance. In reply to Playfair he published an anonymous pamphlet, vehemently defending the clergy against what he regarded as a "separatist and unnatural speculation"—a pamphlet, the main tenor of which, if not its specific statements, he lived to disown. His next publication was in 1807, when, his thoughts on political economy receiving a stimulus from the agitation caused by Napoleon's decrees against British commerce, he issued a pamphlet, entitled "Inquiry into the Extent and Stability of National Resources." This publication had success sufficient to inspire him for a time with the idea of coming to London to increase his literary connections. Reverting to this idea, he continued at Kilmany, with a growing reputation for various attainments, as well as for extraordinary energy, accompanied with some eccentricity, of character and manner. In 1809 he made his first speech in the General Assembly of the Church of Scotland, in a speech of many of his oratorical triumphs in after life. In the same year he became a contributor to the 'Edinburgh Encyclopaedia,' under the editorship of Dr. Brewster, now Sir David; and it was partly to his studies while preparing an article on "Christianity" for that work, and partly to the solemnizing
effects of a severe illness which, during the winter of 1825-6 brought him to the very brink of the grave, that at first seemed as if it must be his last. Then, for the first time, as he thought, he saw Christianity in its true light; and then for the first time also he saw the duties of the clerical office, as he thought, sufficiently deepened. He immediately applied himself to the study of this, that whereas hitherto he had belonged to the 'Moderate' party in the Scotch Church then in the majority, he now ranked with the 'Evangelical' party, which formed but a minority. But the fruits of the change were more immediate in his literary and oratorical than in his clerical duties. Not giving up his studies in natural science and in political economy, but carrying them on with the same zeal as before; contributing also to the 'Christian Instructor,' the 'Literary Review,' and other periodicals—it was not observed that in all that Mr. Chalmers did the influence of a deep sense of religion, and a conviction of the paramount claims of Christian faith on the thoughts of men, were discernible. Always eloquent in the pulpit, his eloquence now burst forth in strains of such passion and fervour as he had never been heard from him before; and from far and near people went to hear the wonderful minister of Kilmany. Bible and missionary societies, for which he had formerly cared but little, now occupied much of his attention; and, instead of giving up his parochial duties, he began to hold sermons from the pulpit, he began a regular organisation of his parish with a view to make himself familiar with the interests of every individual in it, and to provide for all its spiritual wants. But amidst all these new occupations, which he prosecuted with his constitutional enthusiasm, he married, in 1812, Miss Grace Pratt, the daughter of a retired captain in the army. In 1819 his article on 'Christianity' appeared in the 'Edinburgh Encyclopaedia,' and in the same year it was published, with additions, in a separate volume as a treatise on 'The Evidences of Christianity.' The following two years were spent in asiduous parochial work, in theological studies, and in the composition of occasional works on various topics, including one on the reconciliation of scripture and geology.

The name of Mr. Chalmers was pretty well known over the south of Scotland as that of a man of powerful mind and extraordinary eloquence when, in 1815, or in the thirty-sixth year of his age, he was called from his quiet country parish to assume the pastoral care of Tron parish in the city of Glasgow. He remained in Glasgow in all eight years. In 1816 the degree of D.D. was conferred on him by the University of Glasgow. From 1816 to 1819 he was minister of Tron parish. From 1819 to 1823 he was minister of the newly constituted parish of St. John's. These eight years were the period of his highest celebrity as a pulpit orator, his name and fame were all Glasgow rang with his name. One of the most enthusiastic descriptions in Mr. Lockhart's account of Scottish celebrities at that time, published under the title of 'Peter's Letters to his Kinsfolk,' is that given of Chalmers in his Glasgow pulpit. A picture so elaborate and glowing from such a pen of a man whose position was simply that of a Presbyterian clergyman of a Glasgow parish, proves that already he was no longer thought of only in that capacity, but as a man of truly great genius, not what it is, "as Jeffrey, in 1816, "but there is something altogether remarkable about that man. It reminds me more of what one reads of as the effect of the eloquence of Demosthenes than of anything I ever heard." The same impression was afterwards published by all Glasgow. All Scotland—on Haslitt, Canning, Wilberforce, Hall, and Foster. Part of the secret was that Chalmers was not one of those orators whose power vanishes in the moment of their actual utterance, but a man of massive, large, and substantial thought, whose every speech was the enunciation and illustration of some principle or generalisation, and whose language was full of extraordinary felicities, memorable turn of phrase, and gleams of poetic conception. Perhaps the first large manifestation of this was in his sermons on the topic of high intellectual attainments and general literary genius with the specific qualities of the orator, was conspicuously brought out, was on the occasion of the delivery, in 1816, of a series of lectures on Astronomy and Religion. The excitement caused by these 'Astronomical Discourses' was unprecedented; and their popularity, when published in the same year, rivaled that of the contemporary 'Waverley Novels.' But his regular pulpit sermons were no less extraordinary as displays of mental and oratorical energy. It was to this that they gave rise. London, and other places, his fame as an orator preceded him, and drew crowds to hear him. At Edinburgh his oratory was exhibited not only in the pulpit, but also in the debates of the General Assembly, in which he was induced to take part. He was a member of the assembly, and contributed to the debates of the reform parliament of Scotland. Here as a leader of the 'Evangelical' party, then gradually gaining influence and influence, he took a polemical part in some of the Scotch ecclesiastical questions of the time, and always with the effect of a man of the highest talents and of the most earnest and prayerlike"—which, in his own characteristic language, "rites home of its sweets, and by elevating a man above his fellows, places him in a region of desolation, where he stands a conspicuous mark for the shafts of malice, envy, and destruction; a popularity which, with its head among storms, and its feet on the treacherous quicksands, has nothing to look the agonies of its tottering existence but the hoarsannahs of a drizzling generation." Far more important in his own eyes than these pulpit services which brought him fame, were his sermons and his addresses, which exhibited the social efficacy of Christianity. It was Dr. Chalmers's fixed and lifelong belief that in religion alone was there a full remedy for the evils of society, and that all schemes of social amelioration would be useless until the Christian spirit had permeated the hearts of the people down into their habits and households. Subordinate to this belief was his attachment to the parochial system of social organisation—that system which divides a community into small manageable masses, marked out by local boundaries, and having a sufficient ecclesiastical and educational apparatus within itself. Disliking with his whole heart the English Poor-Law system, he was of opinion that, if the parochial system were properly worked, pauperism could be provided for without a poor law at all, by the judicious direction, under clerical and lay superintendence, of private benevolence. In order practically to illustrate these views, he undertook a vast experiment, first with Tron parish, and then with that of St. John's. The population of this latter parish (in which Edward Irving was for some time Dr. Chalmers's assistant) was upwards of 10,000, including perhaps the poorest part of the operative population in Glasgow; but such was his zeal, such his practical sagacity, and such his power of influencing persons to be his agents, that in a short time the parish was organised both for economical and educational purposes in a manner unknown before, schools being set up in every part of it, and the poorest lanes visited periodically each by its own special teacher. His views, his teachings, and all that he did, were, in his speculations in connection with it, were published by him (1819-1823) in a series of quarterly tracts, on the 'Christian and Civic Economy of Large Towns,' which, with two volumes of 'Sermons,' published respectively in 1820 and 1823, two articles on 'Panperitism' contributed to the 'Edinburgh Review' in 1817, and a sermon in the same year on the death of the Princess Charlotte, formed along with the 'Astronomical Discourses' already mentioned, his chief literary exertions during his residence in Glasgow.

In the midst of the bustle and fatigue of his life in Glasgow, increased ten-fold by the hospitality which his celebrity obliged him to exercise, Dr. Chalmers had never ceased to sigh for the academic quiet of a professor's chair in one of the universities, and to address himself year after year to the surprise of the public, he resigned his charge, and accepted the chair of Moral Philosophy then vacant in his native University of St. Andrews. The new post was one of much less emolument, and the writer of the life on which he had resigned, but even had his tastes not disposed him to accept it, had it paramounnt reasons in the state of his health, which was giving way under the wear and excitement of city-life. Forty-three years old when he accepted the chair, he continued his residence in the university for eight years. The winters of these five years were spent by him in the preparation and delivery of his class-lectures, and in the genial society of many of his old friends; but he carried with him a gentlemanly ease and affability, which he had matured in Glasgow, and the little Fife-shire town felt during these five years the vivifying influence of his spirit and enthusiasm. Occasionally he preached in
Andrews and in the neighborhood round; annually in May he visited Edinburgh to take part in the business of the General Assembly, where his eloquence as before was felt as a conquering force on the 'Evangelical' side in all the great controversies of the day. Non-Intervention in Church and State was the general feeling in Scotland and Ireland, and journeys as far as London, varied its summer. It was proposed at one time to elect him to the Moral Philosophy chair in the newly-established University of Edinburgh, but he was not occupied in defending his view of the proper relations between Church and State. Of this controversy Dr. Chalmers was, on one side, the chief champion; and for several years he was engaged in preparing, and occupying a leading part in the discussion of the questions in dispute in speeches both against the 'Moderate' party in the church itself, who had from the first opposed the Veto Act, and also against the civil courts and the government. More than once it seemed to them that the breach which had been made was in danger of being quiet to Scotland; but at last, these hopes being over, the struggle was ended at the meeting of the General Assembly in the 15th of May 1843, by the so-called 'Disruption'—i.e. by the voluntary secession of upwards of 400 clergymen, followed by a large portion of the people of Scotland from the Established Church, and the institution of a new ecclesiastical body called the 'Free Church.' At the head of this secession was Dr. Chalmers, who was nominated moderator of the first General Assembly of the new church.

The last four years of Dr. Chalmers's life were spent by him as Principal and Professor of Divinity in the New College founded by the adherents of the Free Church for the theological education of ministers. (The University of Edinburgh having been necessarily vacated by him on his secession from the establishment). During these years, too, he exerted himself prodigiously in arranging the organization of the new church, and in raising funds for its support; and probably at no period of his life was he more truly a centre of his intellect, his power of dealing with new social emergencies, and of leading men, more conspicuously shown. He had seen the foundations of the new church laid very carefully, and was preparing using in the work of completing its organization into the hands of his many able and younger colleagues, and to devote the rest of his days to his labours as a theological professor, to Christian and philosophical literature in connection more immediately with his the 'North British Review,' then started under his superintendence, and to a new experiment of Christian philanthropy which he had begun in one of the most wretched quarters of the town of Edinburgh, when death removed him. He had just returned from a tour of the present excellent health and spirits, to take part in the proceedings of the General Assembly of the Free Church, when on the morning of the 31st of May, 1847, he was found dead in his bed at his house at Morning-side, near Edinburgh. Of Chalmers's system of religious principles no one who had the advantage of his acquaintance, or who had been occupied in any way, knew the works of Dr. Chalmers have been put forth in twenty-five volumes, and who has also written his life in four volumes, and edited much of his correspondence.

Dr. Chalmers was a man of powerful frame, not tall, but massively built; his head was very large. It was remarkable in a man so celebrated over Britain or as an orator, that he always spoke not only in a broad Scottish, but also in a broad provincial Scottish accent, mispronouncing almost every word. Perhaps it is because his Scotch accent, his accent, and sociable manners, with a great fund of anecdote and broad humour. His works, notwithstanding the force of his intellect that they show (and his speculations in social and political economy, in particular), are valued by many of the best thinkers of the day who have no sympathy with his theological or ecclesiastical opinions), but faintly convey an idea of what the man was while he lived, and of what he still is in the memory and imagination of the Scottish people. He is variously characterized by having a 1-celled ovary, ascending ovules, dotted leaves, and the embryo fused into a solid mass. They are usually small bushes with very few leaves, the flowers have a close resemblance to heaths. All their parts are abased in glandular oily cavities. They are mostly regarded as belonging to Myrtaceae, and there is no doubt of their affinity to that order. Their peculiar aspect, abortive stamens, simple ovary, and pappose calyx sufficiently distinguish

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them. They have the fragrance of *Myrtacea*. Fifteen genera and fifty species are included in this order, all natives of *Myrtacea*. Their position, according to Lindley, is between *Asteracea* and *Combretacea*, near to *Myrtacea*. (Lindley, *Familles Köslers.*

**CHANCEY, COURT OF.** There are now three Vice-Chancellors (6 Vict. c. 5; 15 Vict. c. 4), before whom and the Master of the Rolls sit in this Court are originally held at Westminster, and for the distribution of the business is made the same, according to the statute. 15 & 16 Vict. c. 83, which consists of two Lords Justices; who may either themselves, or conjointly with the Lord Chancellor, exercise all the appellate jurisdiction of the Court, and so the Chancellor, and himself sitting or with a Master, in such cases as the Lord Chancellor is in the whole delay which has always been the standing reproach of this Court was thought to have, have been abandoned, their functions being now performed by the Master of the Rolls and the Vice-Chancellors, assisted by their chief clerks, in their own chambers (15 & 16 Vict. c. 80). The procedure of this Court generally and its jurisdiction in many respects have been subjected to great changes of late years, as to which see EQUITY, BANKRUPTCY, Trusts, CHARTERS, LONATUR, Just-Stock Company, all in S.

**CHADINDEE,** Chaotic Plants, a family invented by Boré, for the purpose of placing a number of the lower forms of plants or organic beings of uncertain character, which cannot be assigned to any of the several well-defined groups of *Cryptogamia*. To this family were assigned forms of *Dictamene*, *Dorideae*, *Nostoc*, and others.

**CHAR.** or **CHARIT,** one of the British species of the genus *Salmn*, of the Salmon tribe (*Salmo salarum*).

**CHAOS.** (Greek.)

**CHARITIES.** [Uszn., S. 2, Trusts, S. 2.] By the Charitable Trusts Act 1833, a body of commissioners has been created for England and Wales, with power to inquire into all charities, their nature, objects, and administrations, and the condition of the property belonging to them, to require the production of accounts and documents from the Trustees of charities, and to cause inspectors to visit and report on their management. No proceeding with reference to any charity can be taken but on the application of the Attorney-General, or of any person interested, for the purpose of removal of the Trust or the sale of its property, which is called 'The Charity Commissioners for England and Wales.' The Attorney-General alone may proceed by ex officio information. The board may direct in what court proceedings for the administration of any charity are to be taken; but where the income is not over 30l., the County Court of the district, or the Court of Bankruptcy of the district in which the charity is situated has jurisdiction. In other cases the Court of Chancery must be resorted to. If the charity be one granted by the Crown, or the Ireland, to the Universities, or the City of London. A report of the proceedings of the Board must be annually laid before Parliament.

**CHASÉ, DAVID HENRY, BARON.** The military defeat of the Spanish in the Peninsular War, and the loss of the Spanish fleet in the battle of Trafalgar, caused a great change in the military system of Spain, and the appointment of Mr. Chasé, as a member of the Spanish government, to visit the north, was the result of the action of the English government, which was then in the hands of the Pitt administration. Mr. Chasé was sent to the north, to report on the state of the army of the north, and on the state of the country. He was at first a member for the north, but after a careful education for that calling, he entered the army as an independent member, in 1785. After various adventures, he appears to have visited Paris shortly before the Revolution, and to have witnessed the capture of the

**BATTLE at 1780.** His eccentric disposition took him to America in 1791, to look for the North-West Passage. He spent several months in the States, with an interview at Washington, visited the falls of Niagara, and roamed through those forests and wild scenes of primitive life which he has described so vividly in 'Rény' and 'Aita.'

On his return home he joined the army of Condé for a short time in 1792, and the next year he began a life of great adventure, which brought him through the Peninsular War, the war of the Revolution, and the war of the Empire, to the march of Napoleon. The best account of his life, which he has left, is in Chateaubriand's 'Memoirs,' almost incredible. Nevertheless he continued in England nearly eight years, maintaining himself by translating for Lord Byron, and became, in 1797, he published in London his 'Essay on Revolutions,' a work full of scepticism: but the death of his mother in 1798 gave a new turn to his thoughts, and restored his faith. In the spring of 1800 he went to Paris, and his old friend, M. Fontanes, whose influence was already strong, had been appointed one of the editors of the 'Mercure,' in the columns of which 'Aita' appeared for the first time. This romance was followed by the 'Genie du Christianisme' in 1802, which made a deep impression on the public mind. The First Consul was so pleased with this work that he took the author into favour, and strove to bend him to his service by two successive employments. Unfortunately the executors of the late Duke of Buckingham, however, refused the proposal, and the First Consul found it impossible to obtain the release of Chateaubriand with too just an excuse, and he resigned his appointment the same day. Fontanes, Madame Bacciochi, and even Josephine herself, could scarcely prevent the consequences of this rash act from falling on Chateaubriand.
The name of Element.  Symbol.  Equivalent.

Aluminum  Al.  13-69
Arsenic  As.  75-00
Barium  Ba.  68-64
Bor  Bi.  70-56
Boron  B.  10-90
Bromine  Br.  78-36
Cadmium  Cd.  64-47
Calcium  Ca.  20-00
Carbon  C.  6-00
Chromium  Cr.  6-00
Chlorine  Cl.  35-50
Cobalt  Co.  58-92
Copper  Cu.  64-66
Diodium  D.  —
Florine  F.  18-70
Gallium  Ga.  20-60
Gold (Arsen)  Au.  19-93
Hydrogen  H.  1-00
Iodine  I.  —
Iridium  Ir.  1-00
Indium  In.  98-98
Iron (Ferrum)  Fe.  52-00
Lanthanum  La.  48-00
Lead (Plumbum)  Pb.  103-56
Magnesium  Mg.  12-67
Lithium  Li.  6-93
Manganese  Mn.  27-67
Mercury (Hydrargyrum)  Hg.  100-70
Molybdenum  Mo.  47-88
Nickel  Ni.  29-57
Nitric  —
Nitrogen, or Azote  N. or Az.  14-00
Natrium (Sodium)  Na.  22-97
Nitric  —
Osmium  Os.  19-86
Oxygen  O.  8-00
Paladium  Pd.  63-27
Palladium  Pd.  63-27
Phosphorus  P.  32-02
Platinum  Pt.  38-63
Permutum (Kalium)  K.  39-00
Radium  R.  211-11
Rhenium  Re.  39-57
Silicon  Si.  21-57
Silver (Argentum)  Ag.  108-00
Sodium (Natrum)  Na.  22-97
Selenium  Se.  32-11
Sulphur  S.  15-00
Tantalum, or Columbium  Ta.  92-30
Tellurium  Te.  66-14
Thallium  Th.  —
Thorium  Th.  21-99
Tin (Stannum)  Sn.  98-82
Titanium  Ti.  39-24
Titan  —
Tungsten (Oxid Wolfram)  W.  184-54
Uranium  U.  60-00
Vanadium  V.  58-58
Yttrium  Y.  82-39
Zinc  Zn.  13-49
Zirconium  Zr.  36-62

In the following articles the number of atoms of each element in a compound body is added. In order to ascertain the relative weight of any element in a compound, the number of atoms of each must be multiplied by its equivalent weight and then the quantity of each element in a given weight of a compound may be ascertained. Most of the references refer to other names, given in the present article; where they refer to previous articles in the Penny Cyclopaedia, P. C. is added.

Absinthium, is an active or bitter principle found in Absinthium Artemisia. It belongs to the class of non-oxidised vegetable secretions. It is neutral in its relations to acids and forms a semicrystalline mass which is insoluble in alcohol. It is intensely bitter to the taste. The same principle is also present in the other species of Artemisia, which have to a certain extent the bitter taste of A. Abnichtium.

Acronytite, C6H7N, is one of the compounds obtained from methyl. It is procured by distilling the double sulphate of potash and methyl with cold water, and then adding potassium carbonate, to the filtrate, until a precipitate of potassium. It is a colourless volatile liquid, has a slightly allacaceous odor, and is somewhat stupefying in its effects. It is very combustible, and when heated with potash it yields ammonia and the salt of potash. Its elements may also be found in the form of a cyanide of methyl C6H5 + CN, and this compound is usually placed by chemists in the series of methyl compounds. (Chemistry, P. C., S. I.)

Acetic, C2H4O. The first effect of the oxidation of ether or alcohol is to produce a compound radical which is acetic. It is however unknown in a separate form, but is easily obtained in the form of a hydrated protodite which is called Aldehyde, C2H4O + H 2O (Chemistry, P. C., S. 1.) or in the form of the hydrated peroxide which is acetic acid C2H4O2 + H 2O. [Acetic Acid, P. C.]

Hydrobromate of Acetylene. May be regarded as the base of other compounds than those of aldehyde and acetic acid; thus oleifant gas or ethylene, C2H4, may be expressed as C2H4 + H 2O, or a hydrobromate of acetylene. (Chemistry, P. C.)

Oxocarbonyl of Acetylene. When ether and dry chlorine are acted on by the sun's rays several compounds are formed, and amongst others this substance. Its composition is C2H4O + O + CI. It has in fact the same composition as acetic acid, but in two equivalents of the oxygen of that compound are supplemented by two of chlorine.

Perchloride of Acetylene, C2H4Cl. This compound is also formed by the action of chlorine on ether, and has the same composition as acetic acid, the whole of the oxygen being substituted by chlorine.

Acids, Organic. The acids met with amongst organised bodies differ in their elementary constitution from the inorganic acids, but are generally formed on the same plan. They are mostly composed of the three elements, Carbon, Oxygen, and Hydrogen, and the theory, in which Nitrogen is not unfrequently added. The proportions in which these elements unite render the atomic numbers of the organic acids much higher than those of the inorganic acids, in which the difference is diminished and in the case of Sulphuric Acid and Nitric Acid, unite in but one single proportion with several proportions of oxygen. The organic acids are easily decomposed by heat, whilst the inorganic acids resist this agency much more. The acetic and citric acids are easily decomposed by heat, but sulphuric and nitric acids resist its action.

There are two theories of the nature of organic acids, by which they are made to harmonise with the constitution of inorganic acids. In the first place, like sulphuric and nitric acids, they are regarded as oxygen acids. In this case, a compound radical is assumed which combines with the oxygen, and forms the acid which, to constitute the ordinary liquid acid, must unite with water. Thus, to take sulphuric acid. One part of sulphur combines with three of oxygen to form the dry acid, which must unite with water to form the liquid acid. Thus S O + H 2O represents the common hydrated sulphuric acid, or oil of vitriol. We may take acetic acid as an example of the organic acid. The compound radical which represents the sulphur of the sulphuric acid is acetyl (C + H 2O). This combines with three parts of oxygen and forms the dry acetic acid. But in order to have the liquid acid there must be an equivalent of water. The two may thus be compared:

<table>
<thead>
<tr>
<th>Salt</th>
<th>Acid</th>
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</thead>
<tbody>
<tr>
<td>S O + H 2O</td>
<td>Acetic acid (C2H4O2 + H 2O)</td>
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</tbody>
</table>

This analogy between the organic and inorganic acids may further be pursued through the whole series. There are, however, many cases in which this theory cannot be proved to be true, in which, in fact, the water cannot be withdrawn and replaced with the facility which the above theory requires.

This has led to a second theory, which is becoming more generally adopted at the present day. It applies equally,
however, to the ioagricic as to the organic acids. It is very obvious that this compound may be arranged as \( SO_3^- + H^+ \), and that such a change may be effected in the expression of any of the acids. In this view of the composition of the acids, the hydrogen, not the water, is the removable element; and it would appear from experimental researches that the water does not exist at all. This theory is more compatible with the real condition of the acids than the first. This constitution is as easily applied to the organic acids as the other. Thus, instead of the above formulary, we may write:

- Sulphuric acid, \( SO_3^- + H^+ \).
- Sulphate of soda, \( SO_3^- + Na^+ \).

The sodium is the place of the hydrogen.

In the constitution of the polybasic acids this theory is more strongly confirmed. Thus phosphoric acid was supposed to assume three forms, according as it united with one, two, or three atoms of water, and these were called mono-, di-, and terhydrated. But Professor Graham showed that it would be better to regard these acids as combined with one, two, and three atoms of hydrogen, and proved that the phosphoric acid in its three forms united with metals by taking the place of the hydrogen of the acid.

That the old formule for the organic acids may be easily reduced to the new is seen in the following examples:

**OLD.**
- Tartaric acid, \( C_4H_6O_6 \).
- Malic acid, \( C_4H_6O_7 \).
- Citric acid, \( C_6H_8O_7 \).
- Meconic acid, \( C_5H_6O_7 \).
- Saccharic acid, \( C_6H_12O_6 \).

**NEW.**
- Acirolein, \( C_4H_6O_7 \).
- Acrolein, \( C_4H_6O_7 \).
- Acrolein, \( C_4H_6O_7 \).
- Acrolein, \( C_4H_6O_7 \).
- Acrolein, \( C_4H_6O_7 \).

**In such acids there is always some hydrogen in the radical, of which it is a constituent, and some combined with the radical, which may be replaced by the metals. Amongst the organic acids, there are some facts which seem to show that this replaceable hydrogen exists. Thus, meconic acid, which is the most easily used, on heating with potassium hydroxide, forms three series of salts, in which one, two, or three equivalents of the hydrogen are replaced by the metal. But while the meconic acid, as well as the tribasic phosphoric acid, readily forms with citric of the silver, the salt of meconic acid may be replaced by silver; it cannot form, or form with difficulty, a similar salt with potash, with which it forms very easily salts with one and two equivalents of metal, and two or one equivalents of hydrogen.** (Gregory). This fact is difficult to be accounted for on the old theory, while it meets with an easy solution on the new. The oxide of silver easily parts with its oxygen, and there is no difficulty with it in substituting three atoms of silver for three atoms of hydrogen, but the potash does not unite with the silver so easily that the oxalate will not form the compound with three equivalents of potassium.

**Acrolein, \( C_4H_6O_7 \).** A substance obtained by Redten- bacher by the distillation of glycerine with phosphoric acid. The operation must be carried on in vessels charged with carbonic acid gas, as acrolein is so rapidly oxidized in atmospheric air, that it cannot be obtained where it is present. It is a very pungent and suffocating substance, attacking the eyes and nose of the operator if care is not taken. It is composed of carbon, hydrogen, and oxygen, and may be regarded as the hydrate of carbonic acid, and the caloric acid. This substance resembles acetylene, and represents in acrolein the position of acetylene in aldehyde. Thus, \( C_4H_6O_7 \) + \( H_2O \) is the atomic constitution of acrolein. But this substance behaves as the carboxylated acid, it is converted into acyllic acid, \( C_4H_6O_7 + H_2O \), a substance perfectly analogous to acetic acid. Acrolein is often formed as the result of the distillation of oils and fats. Thus, castor oil yields acrolein, and some other peculiar products on distillation. Glycerine may in fact be regarded as an hydrated oxide of acrolein with three additional equivalents of water, as follows:

- Glycerine, \( C_3H_5O_3 \).
- Hydrated oxide of acrolein, \( C_3H_5O_4 + 4H_2O \).
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cost however has been very considerable on account of the price of the metals by which it is obtained. Sodium is preferred in preference to potassium, but the metal has first to be obtained by costly processes. These last have been greatly diminished, so that sodium has been recently sold for 10. a pound. This still renders the price of aluminium a barrier to the general use of that metal. Nevertheless it has been extensively used in Paris into spoons, tea-pots, coffee-pots, and other articles of use. In order to obtain aluminium, the chloride is introduced into iron tubes and heated with the sodium.

The chloride of aluminium, from which the metal is prepared, is not a natural compound, but has to be made from the earth aluminas. It is prepared by mixing this earth, freshly precipitated with some form of carbon or carbonaceous substance, as charcoal, sugar, tar, &c., and the whole is made into a paste with water. The paste is then exposed in a crucible, and placed in a tube and exposed to the action of dried chlorine gas, when the chloride of aluminium is sublimed and collected by condensation. It has a straw colour, is soluble in water and crystallizes in isomeric isomers according to temperature, and combines readily with water, from which it is not separated by any means.

Amphemane, another name for Amiline. [Aniline.] Amabile, C₈ H₈ N₄ is one of the bases obtained from oil of bitter almonds, is used in the decomposition of tar, (C₄ H₆ N₂), with which is isomer, by boiling the latter with potash. Amarine forms fine white needles; it is insoluble in water, but soluble in hot alcohol. It has the properties of a powerful oxidizer.

Nitro-indigo-acid, C₈ H₈ N₂ O₃, is one of the products found in the colouring matter of lichens.

Amasine, C₈ H₈ N, one of the numerous bodies formed by the decomposition of indigo.

Amine, a fat, analogous to olestearine, found in ambergris. When treated with nitric acid it yields acminyl acid.

Aniline, C₈ H₈ N. A compound radical, discovered by Frankland. It is procured by the action of zinc on isatin, a substance of the earth oxides, which in its natural state is found in Paris under the name of Barks. It is procured by the long continued action of weak nitric acid on that substance. It is also obtained in the preparation of Indigo. The substance is identified with aniline. The same distinguished chemist has added largely to our knowledge of this substance. He has shown that isatin, which is oxidised blue indigo when treated with potash, yields aniline, and that chlorosine and bromosatine when treated in the same way, yield products of the type of aniline, in which hydrogen is replaced by chlorine, bromine, or both. Aniline assumes a deep violet colour when heated with chlorine, and is used for the purpose of making indigo, and for its power of entering into combination with other substances. Hofmann has obtained it from other substances besides isatin. When anthranilic acid is treated with powdered glass, it is resolved into carbonic acid and aniline. Aniline is distinguished from nitro-indigo-acid by the fact that it is not soluble in alcohol or aqueous solutions when exposed to heat with the bases lime, or baryta. The first yields little, but the last compound is entirely resolved into aniline and carbonic acid. The following is a list of substances which are formed by the simple substitution of other elements for atoms of hydrogen in the aniline base.:

- Aniline: C₈ H₈ N
- Dichloraniline: C₈ H₈ Cl₂ N
- Trichloraniline: C₈ H₈ Cl₃ N
- Bromoaniline: C₈ H₈ Br N
- Dibromaniline: C₈ H₈ Br₂ N
- Tribromaniline: C₈ H₈ Br₃ N
- Chloromethylaniline: C₈ H₈ Cl N
- Nitroaniline: C₈ H₈ N₂ O₃
- Nitrodibromaniline: C₈ H₈ BrN₂ O₃

Chemically, these compounds are of the highest interest. In the case of aniline, bromoaniline, and chloroaniline, chlorine and bromine are substituted for hydrogen, and this was one of the first instances known of the substitution of other elements for hydrogen in a basic compound, although many instances have since occurred. It will also be seen from these compounds that aniline has a close resemblance to ammonia. In the fact, that just as ammonia forms the compounds carbadamide and oxamide, so aniline will yield under the same circumstances carbarnilide and oxamidine. It also forms acid anilines, as carbanilic acid, analogous to the discovery that just as cyanate of ammonia passes into azide, and the cyanate of methylamine into methyl-urea, so cyanate of
aniline passes spontaneously into anilino-resorcin. For a full account of the chemistry of this highly interesting compound, the reader should consult M. Berzinskis's papers Dr. A. Berzinskis (Chemistry—Benzole and Aniline Chemistry—Benzole and Aniline). Anilino-Acid, C₈H₇N₄O₂H₂O, a compound of aniline and cyanic acid. 

Anilino-Lycones, C₈H₇NO₄, a compound of aniline and mellolone, obtained by the heating of anil. Anilino-Acid, a substance obtained by acting on the oil by strong acids, or the chlorides of tin or antimony. It is analogous to benzene.

Antiseptic = Phenomenone = Corrosol of oxides of Methyle, C₆H₅NO. This is one of the many compounds of the oxide of methyle (C₆H₅O). It is obtained by heating anisic acid, which is itself obtained by oxidising the stearene of oil of anise with nitric acid. Antiseptic is the radical of anisic acid, which is thus composed, C₈H₇O₄.

Anisine, C₈H₇N₂O₂. An alkaloid found in a cinchona bark from Arica in Peru. It is similar in its properties to Cinnoline.

Anisine, C₈H₇NO₄, is a volatile principle, obtained from the Anisum Europaeum. It has a remarkable tendency to crystallise in beautifully definite forms. It however readily assumes an amorphous condition, from which it is again easily restored to its crystalline condition. The facility with which, under appropriate conditions, for the crystallisation in general, has been taken advantage of by Schmidt, who has published a paper on the microscopic appearances of this substance during its crystallising condition in the 'Annalen der Chemie und Pharmacie,' for February, 1845.

Anisine, C₈H₇O₄, is a fatty body, obtained from the root of Althamaam orientale. It contains valeric anhydride, united to a base called Oresoleum. Athamantine combines with hydrochloric acid, and the compound, when boiled, deposits crystals of combined water (C₈H₇O₄) a compound that is isomeric with benzoic acid.

Atomine, C₆H₇NO₄, is this substance is an alkaloid, and it is found in the Atropa Belladonna. It crystallises in white silky prisms, which are sparingly soluble in water and ether, but more so in alcohol. It is very bitter, acid, and poisonous, and, like the extract and juice of the plant, dilates the pupil of the eye when taken or applied to the eye externally. It is fusible and volatile, and forms salts with the acids, which are bitter and poisonous. This alkaloid, like many others, is much the most certain form in which the belladonna can be applied for medical uses.

Asmeline, an alkaloid found in the Melia Asmelinea. It forms a compound with sulphuric acid, and is said to be a powerful seirife. Azo-berenyle, C₆H₇N₂, a compound obtained by Laurent from the oil of bitter almonds. Its base is benzoyl combined with nitrogen. Azo-anime, one of the acids formed by the action of nitric acid on oleic acid.

Balsam Arom. C₆H₇O₂H₂O. A fatty acid melting at 164°. Basic Arom., C₆H₇O₂HO. This acid combines like the other fatty acids with oxides of glycercy, or lipoxy, and in this state is present in the butter of Basser Isafiel, one of the butter trees of Africa, and in the fat of Coctis Indicus. It is a crystalline fatty acid, melting at 150° Fahr. It forms soaps with the alkalies. With chlorine it forms chlorobasic acid.

Berezine, C₆H₇O₄, is an alkaloid, and the active principle of the bark of the Beezroot tree of Guiana. The bark of this tree has been found an excellent substitute for cinchona. The resin itself is employed as a substitute for quinine. Planta obtained it in the form of a slow-white, crystallisable powder. Its salts are not crystallisable, and they all act as seirife.

Benzamine, C₆H₇NO₄. This is a compound of benzoyl (Chemistry—Benzole and Aniline Chemistry—Benzole and Aniline) and amine. It is formed when dry ammonia acts on chloride of benzoyl, also when hippuric acid is boiled with peroxide of lead. It forms fine soft needles or powder, very fusible and volatile. It yields ammonia with nitrous acid, and the base, and a benzole is formed.

Benzene = Benzole = Benzol. [Chemistry—Benzole, S. 1.]

Benzamidine, C₆H₇NO₂. This is one of the numerous compounds described by Laurent as the result of the study of hydrocarbons of bitter almonds. It is found in the oil in a crude state. It is crystallisable, and is decomposed by acids into benzoic acid and ammonia.

Benzoin, a name synonymous with Toluol. [Toluol.]

Benzoylglucic Acid, C₆H₇O₂H₂O + HO. This acid is formed when benzoyl and alcohol are heated in the presence of Dr. A. Berzinskis. A compound of benzoyl and alcohol. It is crystal-like, soluble in alcohol and ether, less soluble in cold water. When heated with acids it is decomposed, yielding benzoic acid and glycolic acid.

Benzole, C₆H₇O₂, a product belonging to the benzoyl series. It is procured by acting on crude oil of bitter almonds containing hydrogenic acid with an alcohol solution of potash or sulphate, or cyanide of potassium. It occurs in the form of small crystals, insoluble in water, and soluble in alcohol. Benzole is a crystallisable substance, which is a benzole isomer. It occurs in the form of small white needle-shaped crystals. It dissolves in acids, and is precipitated by alkalies.

Benzoinamide = Hydrobenzoinamide, is formed by exposing a mixture of benzene and ammonia. It is white, tasteless powder, and volatilises without decomposition.

Benzoil, C₆H₇O₂. When Hydrobenzoin (C₆H₇NO) is heated with potash till it becomes blackish brown, this compound is formed. The mass when washed with water separates into two parts, of which the upper is a yellow oil, while the lower gives a bright red colour when acted on by sulphuric acid.

Bolorett, C₆H₇ + 3HO. The name of one of four resinous compounds found in the peat of Denmark on the remains of pine trees. It is a fusible compound, but not combustible.

Bromial, C₆Br₂O + HO. This compound is analogous to chloral (C₆H₇O + HO), and is formed by the action of bromine on alcohol. It is resolved into formic acid, and becomes a powerful poison by compound action of caustic alkalics.

Bromatine. [Aniline.]

Bronaphtic acid, C₆(H₇Br), is one of the numerous compounds obtained from naphthaline. It is formed by the direct action of bromine on naphthaline, care being taken not to add the bromine to the naphthaline, for which reason the compound is called Bronaphtic acid. Naphthaline is a colourless oil, decomposed by chlorine and bromine.

Bronaphtic acid, C₆(H₇Br), is formed by the action of bromine on naphthaline, or on bromosine. It is a crystallisable solid, and forms several compounds with bromine.

Bronaphtic acid, C₆(H₇Br), is obtained by heating the bromide of bronaphtic acid.

Bronaphtic acid, C₆(H₇Br), a compound with the above formula, is obtained in two forms, which are said to be different.

Bottle = Falise, C₆H₇. This compound was discovered by Kolbe, as the result of the decomposition of valerianic or valeric acid (C₆H₇O₂) by the action of the galvanic current. It is a transparent, colourless liquid, insoluble in water, and soluble in alcohol and ether. It has an abnormally small, and a slightly acid, bitter taste. It is combustible, and burns with a bright but smoky flame. By the action of oxygen it is converted into butyric and nitropropprylic acid. Kolbe has obtained a substance, which he calls butyrene, and which is homologous with oleine and with propylene. It has the formula C₆H₇. It is found in oil gas.

Butylamine, C₆H₇N, has been discovered by Anderson in Dips's oil in company with ethylamine, methylamine, propylamine, and other bases. It is a volatile, oily, and powerfully basic substance.

Butyric, C₆H₇O₂H₂O + HO, was originally obtained by Guckelberger, amongst the products of the oxidation of fibre, &c., by sulphuric acid and peroxide of hydrogen. It is highly active in producing butyric acid.

Hydrated Oxide of Butyric, C₆H₇O₂H₂O + HO, was originally obtained by Guckelberger, amongst the products of the oxidation of fibre, &c., by sulphuric acid and peroxide of hydrogen. It is highly active in producing butyric acid.

Butyric acid, C₆H₇O₂H₂O + HO, is the hydrate of butyric acid, and perfectly homologous with other acids with a compound radical, as acetic acid. It exists in butter in small quantities, and is combined in them with acids. It is to this acid that the flavour of butter is mainly due. It can be obtained by fermentation from sugar or starch. The acid may be obtained from butyrate of lime by the action of sulphuric acid. It is one of the liquid substances, having a rancid smell. The rancidity of butter is due to this acid escaping, from its combination with the oxide of glycercyle. The butyrate of lime can be
obtained in any quantity by fermenting sugar with cheese and adding chalk. Carbo nic acid and hydrogen gases are set free.

Acetic-nitride = Cyanide of Propylene, C6 H5 N. It is a question whether this compound is a true cyanide, or a nitrile. It is formed among the products of the oxidation of aliphatic compounds.

Butyramidide, C4 H7 O N H2. This substance is produced by the action on the butyrate of the oxide of ethylene with ammonia in closed tubes.

Butyrene, C4 H7 O. This substance is homologous with acetone and propylene. It is less volatile than propione. It is prepared by heating the butyrate of baryta.


ded by the acid is formed from the cyanide of amyl- or camphorlyle by boiling it with a muriatic solution of potash. The filtrate of potash is obtained, which, on being distilled with sulphuric acid, yields capric acid, which is an oily liquid with a strong smell of perspiration. When united with the oxides of petroleum and petrol, it produces fragrant ethers, having the smell of melons, pine-apples, and other delicious fruits.

Caprons, C10 H20 O. From camphor, by heating the caprate of baryta. It is accompanied by caprylalde and caproal, C10 H22 O.


tes this substance obtained when unaethylic acid is decomposed by galvanism. It is a base similar to ethyle, and probably capable of similar combinations.


t of one of the compounds which gives flavour to this substance. It is an oily acid liquid smelling rancid, and having an odour of sweat. It boils at a high temperature.

Carbamic anhydride, C2 H4 O H O. This is a name given to cane-sugar when it has been exposed to a temperature of 450°. The sugar loses three equivalents of water, and becomes converted into a brown tasteless mass.

Carapine, an alkaloid found in the Carapa guianensis. It forms crystallizable salts with hydrochloric and acetic acids.

Cardamom, C ON H. This substance is produced by the action of chloro-carbo nic acid gas on ammoni. Sal ammoni ac is also formed at the same time. Under the influence of the minerals carbonates ammonium yields ammonia and carbonic acid.

Carbanalide, C6 O H N. This substance is used for the preparation of other species of Capsicum which are used in the manufacture of cayenne pepper. It has a pungent taste, and may be crystallised. It is insoluble in water and ether, soluble in alcohol. It forms crystallizable salts with sulphuric, nitric, and acetic acids.

Carmacine is a name given to succirubric acid.

Camphorine, C10 H16 O. When it is exposed to the action of heat, it first melts and then distills, and yields several oils which, like camphorine itself, are compounds of carbon and hydrogen. One of these is cuminole, which combines with chlorine, forming an oil very similar to camphor. This substance is formed when camphor is passed over red-hot lime.

Catechu, C10 O H N. This substance is used for the preparation of other species of Capsicum which are used in the manufacture of cayenne pepper. It has a pungent taste, and may be crystallised. It is insoluble in water and ether, soluble in alcohol. It forms crystallizable salts with sulphuric, nitric, and acetic acids.

Catechol = Tannin monochloride, C6 O H. It is that portion of catechu which is insoluble in cold water. It is soluble in hot water, and crystallises in the form of a white silky powder. When heated with caustic potash it yields a black acid called saponic acid. Carbonate of potash produces with it rubic acid (C6 H10 O3), which has a red colour.

Cassia, the native name of the various species of Cassia, which are used under the name of Cinnamon.

Ceyrek, one of the products of the distillation of coal tar discovered by Reichenbach. It is a volatile solid, and is obtained from the reaction of potash and acetic acid. It crystallises in a solution of a mixture of iron, forming orange red crystals, which dissolve with a blue colour in sulphuric acid. The colour of oil of tar seems to be owing to this substance.
CHED is that part of the gum of the cherry-tree which is insoluble in cold water. It is probably some transitional form between starch and gum.

Cheredd Acim is a substance said to exist in the fatty matter of the brain. It is accompanied by another acid, the olo-phosphoric acid, which is supposed to be united to a compound radical cerebrolene, in the manner of the fatty acids. These substances are of a very denatured nature, and the chemistry of the nervous system is at present in a very imperfect state.

Cherebnot. [Cherebon Acim.]

Chesan, C^6 H^4 O, is a solid wax-like body. It has been obtained as a compound of sulphuric acid with cetone, C^6 H^4 O + H O + 8 O.

Cheswee, C^6 H^4 O, is a waxy substance found on the surface of saols. It is not saponifiable.

Chesnorie, Acim, C^6 H^4 O + H O. This compound was discovered by Brodie as an ingredient of bee’s wax in a free state. It may be procured by dissolving wax in hot alcohol, and dissolving the residue deposited on cooling till its melting point rises to 162°. It is then purified by ether till its melting point is 171°, which is that of the acid. This substance was formerly called cereine. It has, however, acid properties, and combines readily with bases. It combines with alkalis, forming the compound of that substance, C^6 H^4 O + C^6 H^5 O, which is called cereitone. When heated with potash, it produces carbonate of potash and the hydrated oxide of cetye, or cetye alcohol.

Chlor, C^6 H^4 O, the base of cetye acid. [Chloro Acim.]

Cetale, C^6 H^4, a compound radical of the series C^6. It forms the following compounds:

Cetyl Alcohol = Ethyl, C^6 H^4 O H O. When spermaceti or whale oil is boiled with an alkali, a cetylate of the alkali is formed, and the hydrated oxide of cetye is left. Although a true alcohol, it is not liquid, but a fat, melting at a temperature of 115°. The crystalline part of spermaceti is called cetyl, and is a cetylate of the oxide of cetye.

Oxalic acid, COO H O, is produced by the action of sodium on cetye alcohol, when hydrogen escapes, and the remains being heated with iodide of cetye, yields iodide of sodium and oxide of cetye.

Some are in use, in which, C^6 H^4 O, is perfectly homologous with anphosphic acid: chloride, bromide, and iodide of cetye are also known.

Cetyl Acid = Ethanoic Acid, C^6 H^4 O + H O, is obtained from spermaceti by saponification, and adding some stronger acid to the compound. Its salts with the alkalies form soaps. It melts at a temperature of 131°.

Tertiaryamine, C^6 H^9 N, is formed when dry ammonia acts on iodide of cetye.

Cynanoic Acid is isomer with cetye acid, but melts at a temperature of 140°. It is the chief solid acid of palm oil.

Chelerythrine, an alkaloid found in company with Chelidonine in the celandine (Chelidonium majus). It forms a green, volatile, and violent ether. We form three salts with the acids, which are narcotic and poisonous. Chelidonine is a bitter substance, insoluble in water, and forming crystallizable salts.

Cinchonene, an alkaloid very similar to Vinic. The first is found in the snowberry (Chimona racemosa), and the second in the violet (Viola odorata). Their action on the human system is precisely similar to that of Emetine obtained from ipecacuanha. On this account it has been assumed that they are emetine disguised with foreign matters.

Chelaphosphate, C^6 H^6 Cl. This is the first of a series of compounds formed from Naphtaline, and described by Laurent. Naphthaline is composed of C^6 H^5. Laurent has shown that various elements will amputate the hydrogen, and that not only in one, but in several proportions. He has therefore proposed to give names to these compounds, according to the quantity of the element supplanted (the hydrogen). Then that in Chelaphosphate one atom of chlorine supplante one atom of hydrogen. According to the number of atoms supplanted, Laurent employs the vowels a, e, o, n, in the last syllable of the name. Thus, Chelaphosphate has one atom of chlorine, but Chelaphosphatone (C^6 H^6 O + 4 C^1) has three atoms, and Chelaphosphinate (C^6 H^6 Cl + H) has five atoms. When the vowels are exhausted, Laurent adds a syllable, so the compound C^6 H^6 Cl is

Chelaphosphate, the compound C^6 H^6 Cl, is Chelaphatisine. The same plan is pursued with bromine. But in all these cases the hydrogen may be replaced by atoms of both chloro and bromine. In the same way the vowels are made to do duty for these compounds, as follows: chelaphosphate, C^6 H^6 Cl; chelaphosphatone (C^6 H^6 O + 4 C^1) Br; chelaphorphosphate, C^6 H^6 Cl + 4 C^1 Br; chelaphorphatone (C^6 H^6 O + 4 C^1) Br; chelaphorphosphate, C^6 H^6 Cl + 4 C^1 Br. All these compounds are capable of acting as bases and combining with elements. Thus we have chelafide of charcoal, chelaphosphate of chelaphatisine, etc., bromide of chelaphorphosphate, etc.
COMPOUND Radical, a term applied to those combinations of the elements which act towards oxygen, hydrogen, and acids, as simple elements. Examples of such compound bodies will be found under the heads, amyle, butyl, cetyle, &c.

COLLOID. [Gen. Cottton.]

Creatine, C₆H₁₂NO₃. This body, originally discovered by Chevreul, occurs in transparent very brilliant crystals. It forms a crystallizing base, melting at 305°; and like that of pharynx. It dissolves in 7 parts of cold water, and in boiling water in such quantity that on cooling the solution becomes consolidated into a mass of glistening needles. It dissolves without change in all the alkalis in aqueous solution. It forms no definite salts with acids. According to Liebig it is best obtained from finely chopped flesh that has been well kneaded with water, and the fluid removed by pressure. The coagulable matters are then removed by boiling, and the phosphates by dilute baryta. The fluid left is then evaporated till the creatine is deposited in the form of needles. Creatine can also be obtained from the urine. It appears to be produced in the flesh of animals as the result of a process of retrogressive change in the elements of the tissues in which it is found. It is in fact a product of excretion.

Creatinine, C₆H₁₄N₂O₇, was discovered by Liebig. It is obtained from creatine by the action of hydrochloric acid. It is found also in the muscled and the urine, with creatine, whilst these bodies are in their normal condition. But in putrefaction either creatine is formed. Hence creatinisation may be regarded as the result of the decomposition of creatine.

Cumidine, C₆H₁₂N₂, is obtained from the oil of cinin. It is a crystallizing basic aniline, and like that base it combines with chlorine, bromine, &c. Cumole, C₆H₁₃, is found in the oil of cumin and in the oil of coal-tar. Cyanidine, C₆H₁₂N₂, and cyanole, C₆H₁₃, are found in commerce with the above compounds in the same oil. One of the curious properties of this substance is formed by the decomposition of cyanic acid when left to itself. It is an opaque white solid body, which has no acid properties. It dissolves in liquid potass with disengagement of ammonia, and the solution yields cyanate of potash.

Diosmine, C₇H₁₀O₂, is obtained by heating oil of turpentine with lime. It is a pure oil.

Diamylamine. [Amlte.]

Dihydroamineline. [Amlte.]

Dihydroaminoline. [Amlte.]

Diole. [Amlte.]

Dithylene. [Cyclamidic Acid.]

Elastic Acid, a fatty acid, obtained by the action of nitric acid on oleic acid.

Ethylen. When aldehyde is kept for some time in sealed tubes, it is converted into two polymeric bodies, methylethyle, a hard crystalline inodorous solid, and ethylene, which is a liquid.

Ethylic Acid = Oricinalonecarid acid, C₃H₆O₃. One of the acids composing the lichen, Roccella tinctoria, lichens which yield the commercial substance arbutin. This acid is the most important of all the principles found in lichens. It yields ether when boiled with alcohol. Besides ethylic acid, lecanoric, alpha orotic, beta orotic, and reccoric acids have been found in lichens. They yield red dyes with ammonia, and are employed extensively in the dyeing of cotton and woollen cloth. These acids have been investigated by Scharnck and Stenhouse, and the latter recommends the use of these lichens, in order to obtain ethylic acid, which and which are not possessed by lichens in larger quantities than 2 to 12 per cent, should be separated on the spot where they grow, and thus spare the expense of the carriage of the useless parts. These acids are extracted by the following process:—The lichens cut in small pieces are moistened with water, and after standing half an hour slaked lime is added, and the mixture allowed to stand for a time. It is then placed in a vessel with a double bottom, the upper being perforated and the liquid displaced by caustic alkali, and left as long as necessary, when a deep purple red colour with bleaching liquor, a character belonging to all the acids which yield arbutin. The solution is then saturated with hydrochloric acid, and a gelatious precipitate falls, which is collected, and dehydrated, and is found to be the double salt from it by weak alcohol without boiling, which would form ether compounds." (Gregory.) Besides the acids there are three other compounds found in the lichens used for dyeing.—Orice, Piercrysthine, and Bryogromannite.

Oricine, C₅H₈N₂O₆, occurs in the form of large transparent crystals. It has a sweetish taste, and is very soluble in water. When mixed with ammonia and exposed to the air, it assumes a deep red colour; and when mixed with the fixed alkalies it has a rich violet colour.

Piercrysthine = Erythrin—bitter = Amaryrine, C₄₈H₆O₃, is formed when erythric acid, or the lichens containing it, are boiled in water.

Erythrone, C₂₄H₃₄O₁₈, is formed when piercrysthine is boiled with baryta. It is dissolved by water and alcohol. It forms large colourless crystals, which have a sweet taste.

Ethyl. [Cettle.]

Ether, Betic, [Cettle.]

Ether, Camphor. [Cammphoric Acid.]

Ether, Amylic. [Amlte.]

Ethylandimonine. [Ethylic.]

Ethyle, C₆H₁₂. One of the earliest known of the compound radicals, and the base of the well-known substances ether and alcohol. It was for a long time unknown except in combination. Frankland, however, at last succeeded in separating it by the action of zinc in closed tubes upon the iodide of ethyl. The following equation expresses this result:—C₆H₁₂ + Zn = Zn + C₆H₁₂. Part of the ethyle, however, is converted into zinccethyle, C₆H₁₂ + Zn, and another part into methyle and eloye. In the latter case the ethyle becomes C₆H₁₂ + C₆H₁₂. Ethyle is a colourless gas, having a faint, sweet, aromatic odour, with a bright flame. It has a specific gravity of 2.00394, and is condensed into a liquid with 2.1 atmospheres. It is perfectly analogous to methyl (C₆H₅), and according to the law which regulates the density of these compounds, its density is higher whilst its volatility is less.

Oxide of Ethyl = Ether = Sulphuric Ether, C₆H₁₈. This ether is occasionally found in nature combined with acetic, butyric, and other ethers, which are found giving results to such fruits as melons, and the burning of the grain. This compound is obtained from alcohol by acting on it with sulphuric acid. [Ether.] Ether is now known to be perfectly analogous to the metallic oxides, its compound base ethyle taking the part of the metal. Thus, as K O + A represents acetate of potash, and K O Br represents benzate of potash, so C₆H₁₂ + O = C₆H₁₂ O₂. This substance is formed when ether and water meet in their nascent state, as when some of the acid salts of ethyle are decomposed by heat. It is however produced during the fermentation of glucose, a longer, which is composed of C₆H₁₂ O₂. During fermentation this compound loses 4 atoms of carbonic acid and leaves behind 2 atoms of the hydrated oxide of carbonic acid. Thus,

<table>
<thead>
<tr>
<th>Glucose</th>
<th>112</th>
<th>112</th>
<th>4</th>
<th>4</th>
<th>0</th>
<th>8</th>
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<tbody>
<tr>
<td>2 atoms of alcohol</td>
<td>8</td>
<td>12</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>8</td>
</tr>
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| [Alcohol, P. C.]

 Chloride of Ethyle, C₆H₁₂Cl, is formed by saturating alcohol with hydrochloric acid, and distilling the mixture in a vapid-bath, when the chloride of ethyle passes over.

 Bromide, Iodide, and Sulphide of Ethyle, are analogous compounds, consisting of one atom of ethyle and one of the other elements.

Hydrosulphuret of Sulphuret of Ethyle = Merscaptan, C₆H₁₂S₂, or C₆H₁₂S + H₂S, is formed when the double sulphate of lime and oxide of ethyle is distilled with its own bulk of a solution of potash saturated with sulphureted hydrogen, and converted into K₂S + H₂S. It has a pungent and penetrating odour, smelling like the essence of onions concentrated. It adheres to the hands and clothes most pertinaciously, and is a most offensive subject to operate upon. Zete has a greyish-brown fluid of ethyle, C₆H₁₂ + Sr. Selenturet of Ethyle is formed when sulphuret of ethyle and potash is distilled with sodium in potassium. It is a volatile liquid, having an offensive alliaceous odour.

 Cyanide of Ethyle, C₆H₁₂ + C₂O = C₆H₁₂ N, is procured by heating cyanide or ferrocyanide of potassium with the double sulphate of potash and ethyle. It is a very offensive compound, smelling like putrid fish. It produces stupefaction when inhaled.

Oxide of Ethyle unites with sulphuric and phosphoric acid.
acids, forming sulphates and phosphates. *Nitrate of the oxide of Ethyle, C₂H₄O + N O₃*, is the Nitric Ether of carbo-nitrous acid, and the *Sodium Nitrite* of Nitric Oxide is a compound of Nitric Oxide and Sodium, and *Nitrous acid* is the gas produced by the decomposition of Nitric Oxide by heat.

**Carbonate of Oxide of Ethyle** = *Carbonic Ether, C₂H₄O + CO₂*, is an aromatic liquid, boiling at a temperature of 260°. It unites with carbonic acid of potash, forming a double carbonate of ethyle and potash, C₂H₄O + O₂K + CO₂.

**Carbonate of Oxide of Ethyle** = *Carbonic Ether = Oxidum of Ethyle, C₂H₄O₂N O₃*, is formed by the action of ammonia or Chlorocarbonate of Ethyl, C₂H₄ClO₂, with sal-ammoniac. It is distilled over, and crystallises on cooling. *Lactamide, Sarcoine*, and *Alanine*, are substances having the same composition, but assuming very different forms. The following is a list of some of the bodies formed from ethyle, or having this substance as their base. This list not only indicates the relations of ethyle, but of several other compound radicals which may be substituted for it.

**Oxalate of Ethyle** = *Oxalic Ether, C₂H₄O + O₂N O₂*.

**Acid Oxalate of Ethyle** = *Oxalonic Acid, C₂H₄O + O₂N O₂*.

**Oxamate of Oxide of Ethyle** = *Ethylamine, C₂H₄O + O₂N O₂*.

**Carbonate of Oxide of Ethyle** = *Benzoe Ether, C₂H₄O + CO₂*.

**Hippurate of Oxide of Ethyle** = *Hippuric Ether, C₂H₄O + N O₂*.

**Salicylate of Oxide of Ethyle** = *Salicylic Ether, C₂H₄O + O₂N O₂*.

**Cyante of Oxide of Ethyle** = *Cyanic Ether, C₂H₄O + N O₂*.

**Ethyle-urna, C₂H₄N O₂*.

**Ethylamine, C₂H₄N*.

**Diethyamine, C₂H₅N O₂*.

**Triethyamine, C₆H₁₃N O₂*.

**Tetrothylamine, C₆H₁₃N*.

**Methylisothylamine, C₆H₁₃N O₂*.

**Salicylic ether** is an acid, C₂H₄O + O₂N O₂, which occurs in the radicyle, C₂H₄O₂N, and formyle, C₂H₄O, are produced. (Acetic; formyl.)

**Excretin** is a substance discovered by Dr. Marce in the excretions from the human bowels.

**Peculiar** is a soluble volatile crystalline substance, found in the spoile of the Filtrum-gebhe, which is probably derived from the essence of turpentine, and has a composition C₂H₄O₂N.

**Formic Acid**. (Formyl.)

**Formyl.** C₂H₄ is a compound radical unknown in its separate condition. When hydrated oxide of methyl is distilled with sulphuric acid, water, and peroxide of manganese, a liquid is produced which contains a formate of the oxide of methyl, and a liquid called methylal, C₂H₄O₂.

The latter is regarded as a hydrated oxide of formyl, and it is found that this hypothetical base is capable of entering into combinations in the same way as ethyle, acetyle or methyl.

*Acrolein, C₂H₄O₂*, is a tercxfylle of formyl. It originally obtained its name from having been found present in the redant, (Formical ruga). Hence also the name of the base formyle.

This acid may be procured from pyrolytic spirit, C₂H₄O₂ + H₂O, by the loss of two equivalents of hydrogen, and the addition of two equivalents of water to C₂H₄O₂. It may also be procured by mixing starch or sugar with peroxide of manganese, water, and sulphuric acid, and distilling. It is found also under a very great variety of circumstances. It unites with lead by forming a formate of lead, and from this formiate of soda may be procured by the addition of carbonate of soda. It unites freely with most of the metals, and the salts when heated in closed vessels give off carbonic acid and carbonic oxide, leaving the pure metal. It unites also with ammonia, the base being formed of hydroxyl, carbonic acid, and water. *Chloroform = Tetrachlore of Formyle, C₂H₄Cl₂O₂*, combines with formyle and forms a very interesting series of compounds.
are nitric acid, water has disappeared, and the rest is cellulose. According to Porrett and Foscheiner, gun-cotton contains 88% NH₃. The cotton was immersed in water and then rinsed in the use of gunpowder, as in fire-arms its explosive force is found inferior, but in the blasting of rocks it possesses some advantages over gunpowder. Gun-cotton is soluble in other, and a compound is formed, to which the name nitrocellulose acid and nitrate is given. It is the greatest use in many of the arts, especially photography. On being exposed to the air the ether evaporates, leaving a thin transparent film behind. This is applied to wounded surfaces instead of gunpowder, and after the ether has been driven off, the cellulose acid may be introduced for balloons. In photography the collodion is mixed with the iodides to be acted on by light, and, being spread on glass, pictures from which any number of impressions may be taken, are produced.

HARMALINE, C₄H₆N₂O₁₃, is a resaloid occurring in the seeds of Peganum Pernum. They are united with phosphoric acid. Harmaline forms yellow salts with the acids, and is transformed into a red salt by oxidising agents. The harmalin red of commerce is the powder of the seeds. It is used in dyeing red, rose-colour, and pink. It is used in large quantities in Russia. Harmaline yields a number of substitution products, such as a-Karkandine, cyanoharmaline, &c.

LHENG, C₁₀H₁₀N₂O₄, is a white fragrant deep-yellow powder, which is the powder of the seeds. It is used in dyeing red, rose-colour, and pink. It is used in large quantities in Russia. Harmaline yields a number of substitution products, such as a-Karkandine, cyanoharmaline, &c.

LELLENING, C₂₀H₂₂N₂O₄, a compound formed when salicine is acted on by dilute nitric acid. It contains the elements of sugar and hydrazide of salicyle. It crystallises in the form of yellow needles. When heated to 347° it forms a resinous insoluble substance.

HULLUSINE, C₁₀H₁₀N₂O₄, is a yellow powder, which is the powder of the seeds. It is used in dyeing red, rose-colour, and pink. It is used in large quantities in Russia. Harmaline yields a number of substitution products, such as a-Karkandine, cyanoharmaline, &c.

HYPERLURACIN, C₁₆H₁₄N₂O₄, discovered by Unger, and formed by burning on charcoal with hydrochloric acid, has been called chloro-phenol. It differs in composition from nitric acid by 1 equivalent of water and 2 of oxygen, hence its name. It is colourless, and crystallises in short rhombic prisms, and when heated, is resolved into hydrated cyanic acid, water, and carbon.

HUMALLINE, C₁₀H₁₂N₂O₆, a carbonyl hydrogen found in the mines of Idria. It colours sulphuric acid intensely blue. It is probably identical with succinisterine, a substance obtained from amber, and which has the same property of colouring oil of vitriol intensely blue.

HYRITHOXINE, C₁₂H₁₂O₂₂, discovered by Auber, and formed by burning on charcoal with hydrochloric acid, has been called chloro-phenol. It differs in composition from nitric acid by 1 equivalent of water and 2 of oxygen, hence its name. It is colourless, and crystallises in short rhombic prisms, and when heated, is resolved into hydrated cyanic acid, water, and carbon.

LACTAMINE, C₁₆H₁₄N₂O₄, is obtained by the action of lactic acid on ammonia. It is interesting as being identical in composition with the name of this substance, which is the real one, and is found in many sizes of crystals.

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covered by Schunck, to whom chemistry is greatly indebted for a knowledge of the compounds contained in the roots of Liriope.

Liriope is the name given to a substance possessing the properties of gum, and which is produced by simply exposing starch to a temperature of 300°. It has a brown colour and a sweet and aromatic smell, and is externally used instead of this substance in calico printing.

Lucido Acid, CO₂H₂O₄, an organic acid belonging to the lentic acid series, is a substance identical in composition with glycyrrhizic and alamine. It has the same relation to valeric acid that they have to formic and acetic acids. It forms crystalline scales, which are volatile, and when heated with potash they yield valeric acid, carbonic acid, and hydrogen. The latter substance has been detected in the liver of the calf as a natural product. It is also found among the products of the putrefaction of fibrous and albuminous substances.

Lucidol, CO₂H, is one of the compounds found in the least volatile portions of the basic oil of castor. It is also formed when quinine, cinchonine, strychnine, or thialine are heated with potash. It is a liquid with a disagreeable smell, and boils at the temperature of 460°. It neutralises acids, and forms with them a crystalline salt.

Lycocysteine [Harmaline].

Lycoperone, CO₂H₂O₆, is a variety of starch found in the Lichen Islandicum, or Iceland moss. It is colourless and tasteless, swelling up into a jelly-like mass in cold water, and dissolving in both water and alcohol on being boiled with a bituminous kind. It is not coloured by boiling with iodine, but the jelly is. It is converted into sugar by dilution and boiling sulphuric acid.

Limonin, CO₂H₂O₅, is a bitter crystalline substance formed from limes and oranges. It closely resembles Chineine, the bitter principle of the Cinchonaphthalein. It contains 2 atoms less water.

Lilac. [Glyceeryl.]

Lophine, CO₂H₂, is one of the bases derived from the oil of bois de rose. It is formed when hydrobromide (CO₂H₂Br₃) is distilled. Ammonia is given off, and lophine is left undissolved. It is soluble in alcohol with acids, and precipitated again by ammonia. It occurs in the form of fine silky crystals, and acts towards acids in the manner of a base. By the action of nitric acid it yields a yellow crystalline compound called trigonocephale.

Luteolin is a non-aestivated coloring principle found in the wood (Isatis tinctoria). It is volatile and crystallisable.

Luteolide, and Malamino Acid, are synonyms of Asparagine and Aspartic acid. [Asparagine - Chemistry, S. 1.]

Melampyrine is a crystallised non-aestivated substance obtained from the cow-wheat, Melampyrum nemorosum. It is a white powder like desiccated sugar.

Melasine Acid, CO₂H₂O₄, is formed from cane sugar by the action of heat and alkalis. It has a very dark colour, and when thrown down by hydrochloric acid appears as a black flocculent deposit.

Melosin Acid, CO₂H₂O₄, is one of the substances yielded by wax. According to Brodie, when the hydrated oxide of melosine or melasine is heated with lime and potash, it yields hydrogen gas and melasine of the base. When the acid is separated, it presents itself as a crystalline wax-like substance, melting at 192°.

Melrose. [Manson - Chemistry, S. 1.]

Mesalin, CO₂H₂O₄, a negative radical found in myricine, a substance which forms about four-fifths of bees' wax. It consists of the hydrated oxide of melasine combined with palmitic acid. The palmitic acid is easily separated from the hydrated oxide of melasine by saponification. The latter is a true alcohol, and, like common alcohol, yields a carbolic acid resembling olefiant gas. Its composition is CO₂H₂O₄. It is identical with the acid volatile in scotch whiskey. This compound is very interesting, as it has been shown by Brodie to possess the same relations, and to form a series of compounds homologous with those of ethylene and methylene, the latter being a carbonyl alcohol.

Mesembrine, CO₂H₂O₄, is a white fusible crystallisable alkaloid, forming salts with the acids found in the seeds of the Mespilus Physalis. It is also known as Coccus Acid.

Mестиллин, CO₂H₂O₄, is obtained from the distillation of acetone with forming sulphuric acid. Thus, 3 mol. of acetone = (3(CO₂H₂O₄), yield 6H₂O and mesityle. The atoms of hydrogen may be substituted by chlorine, bromine, and nitrons acid.

Mesilomine Acid, CO₂H₂O₄OH₂, is an acid described by Gottlieb and obtained from the action of nitric acid on echinacea citric acid. It forms minute crystals, sparingly soluble in water.

Methionine Acid, S₂C₂H₂O₅, this acid with Ethylic, isethionic, and althionic acid is formed by the action of sulphuric acid on ethylene and alcohol.

Méthyl-urea. [Aniline.]

Méthylidoethymalylum. [Amylne.]

Méthyllethylmalylum. [Amylne.]

Micinomonic Acid. The tannic acid produced from catech in possessing the composition different from that of the tannic acid from oak bark, and Berzelius proposed calling the one minomonic acid, from Mizoma, and the other quercinonic acid, from Quercus, the name of the oak.

Micrargine. [Méthylène.]

Myronispermine. Balsam of Peru, according to Richter, contains two oils, myroxyline, which is insoluble in alcohol and myrinospermsine, which is soluble in that liquid. The latter substance when treated with an alcoholic solution of potassium yields a resin resembling cinnamonic acid, which is called myricpic acid.

Myristic Acid, CO₂H₂O₄ + H₂O, is a crystalline fatty acid found in the seeds of Myristica scoirba, the common nutmeg. Combined with the oxide of hylipie, it forms the most fragrant of essences, that known as natural musk, the oxide of ethyle a myristate which is an oily liquid.

Naphthalin, CO₂H₂, or CO₂H₃, is found in all kinds of tar, but especially in coal tar. It is easily obtained by redistilling this substance, when it occurs in the form of a solid state. It may be then purified by sublimation and crystallised from hot alcohol. It is colourless and volatile, forming large tabular transparent crystals, with a peculiar smell and an acid taste. It is volatilised like camphor by exposure to the atmosphere, and is a constituent of 414°. It forms with bromine and chloride a large number of compounds by substitution, and is acted on in the same way by sulphuric and nitric acids. These compounds have been studied with great diligence and singular accuracy by Laurent, who has found on their his great law of substitutions, which has been one of the most remarkable aids to the development of modern organic chemistry. [Chlorinaphthale.]

The compounds of chlorine and bromine with naphthaline are very numerous, and have many of them been carefully described. The whole number of these two elements with naphthaline amounts to the large number of 1040. In the same manner sulphuric and nitric acids are found to act on naphthaline, and to give a long series of compounds highly interesting to the chemist, but which have not yet been fully studied. The following are a few examples of these compounds:

Hypomorphonaphthalic acid. CO₂H₂S₄O₄ + H₂O.

Hypomorphonaphthalic acid. CO₂H₂S₄O₄.

Sulphonaphthale. CO₂H₂S₄O₇.

Sulphonaphthale. CO₂H₂S₄O₇.

Nitronaphthale. CO₂H₂N₄O₇.

Thionaphthallic Acid. CO₂H₂N₄O₇ + H₂O.

Nitronaphthalene. CO₂H₂N₄O₉.

Nitronaphthalene. CO₂H₂N₄O₉.

Odonine. [Picoline.]

Cénaétique Acid, CO₂H₂O₄ + H₂O, is found in wines in combination with oxide of ethyle, forming an ether, which is one of the most important of the ethers of wines. It is also found in the spirit of fermented grains. In order to obtain the acid, the ether is decomposed by caustic potash, and the manesate of potash thus formed is distilled with dilute sulphuric acid. The acid thus obtained is a semi-liquid substance insoluble in water, but soluble in alcohol and ether. The manesate of oxide of ethyle, manesane ether, is a colourless liquid, having the well-known smell of wine, and producing a stupefying effect. This ether has been shown by Mulder to be only one of many ethers which give the long series of compounds known to wine. (Mulder's Chemistry of Wine.)

Cénaétique Acid, CO₂H₄, is known by some of its compounds. Hydrated Oxide of Ebanyle - Ebanyle - Ebanyle - Ebanyle - Ebanyle + H₂O, the latter is the alcohol of anamathine acid, and is obtained from castor oil. Anamathine Acid, CO₂H₂O₄ + H₂O,
is an oily acid, and yields fatty salts. The enanthuates of the oxides of ethyle and methyl are fragrant compounds.

Quercitrine. [Quercitine.]

Oxalic acid, CO\(_2\)H, is obtained from the phellandrene of amber by the loss of one equivalent of ammonia and four of water. It is a pale yellow powder, which, when boiled with water, yields oxalic acid and phellandrene.

Oxalyl acid, CO\(_2\)H\(_2\)O, is formed from the decomposition of Oxychelic acid, one of the compounds contained in opium. This acid forms soluble and crystallisable salts, with the oxides of the metals and oxide of ethyle. The latter is orange.

Oxaline, CO\(_2\)N H\(_2\) O\(_3\), is a crystalline compound found in company with narcotine and other compounds to opium.

Oxaline, CO\(_2\)H\(_2\)O, is formed by the action of nitric acid on narcotine. It crystallises in fine needles, which are soluble in ether and alcohol, and become a deep blue when brought in contact with sulphuric acid.

Orthine. [Orthinic Acid.]

Ortholine. [Athlanticine.]

Orthic Acid, O O\(_3\) N H\(_2\), is one of the products of the action of heat on oxalate of ammonia. This acid forms soluble and crystallisable salts, with lime, baryta, ammonia, and oxide of silver.

Palmatic Acid. [Cetyl.]

Paraffine, CO\(_2\)H\(_2\) O\(_3\), a crystalline base discovered by Meck in 1803.

Paraffin acid, CO\(_2\)H NO\(_3\), is formed when mellitate of uric acid is heated in a retort to about 330°. It is accompanied by another body called Ethyric Acid. Paraffin acid is a solid yellowish oil, which, when boiled with water, changes into a bismutinate of ammonia.

Paraphenylene = Atracene, CO\(_2\)H\(_2\), is a substance polymeric with naphthalene, and also found in coal tar. It melts at 366° and distils at 392°, crystallising in foliated plates. It forms with nitric acid a series of compounds, in which oxygen is substituted for hydrogen. These compounds are again capable of uniting with hyponitrous acid. As with the compounds of naphthalene we are indebted for all that is known of these to the researches of Laurent.

Paraline Acid, CO\(_2\)H\(_2\), O\(_3\), one of the substances produced in the various dyeing lychens of commerce. It is found in company with lecanoric acid.

Parietine = Bhrabarine = Parietine Acid = Chrysophane Acid, CO\(_2\)H\(_2\) O\(_3\). This substance, which was first found in rhubarb and has the above names, is also found in the Parmelia paretina. [Chrysophane Acid.]

Pelargonion Acid, CO\(_2\)H\(_2\) O\(_3\) H, is found in the oil of Pelargonion roseum. It is an acid oily liquid, with a rancid smell, and resembles aloe-ether in both its chemistry and constitution. It passes on heating through a volatile, tasteless, colourless liquid, CO\(_2\)H\(_2\) O\(_3\) H, which is an oily liquid of a very peculiar smell. It is stated by Frankland that whiskey owes its peculiar flavour to this compound. It is manufactured for the purpose of giving new whiskey the flavour of old. It is probable this acid is formed from sugars, as all oily acids are found to be.

Phenec, CO\(_2\)H, the hypothetical base of carboxic acid, which according to Laurent is an Hydrated oxide of Phenyle, CO\(_2\)H\(_3\) H O\(_3\). Laurent has succeeded in obtaining with this radical phenyle a series of compounds resembling those of indigo, salicide, and other bodies.

Phelline is a non-grossed compound, crystallising in silver scales and of a bitter taste, obtained from various species of Philea.

Phlebotine. [Phlebintin.]

Phlebinedine. [Phlemin.]

Phlorin, CO\(_2\)H\(_2\) O\(_3\), is a substance closely resembling uric acid. It is obtained from the roots of the apple, pear, plum, &c., and is extracted in the same way as salicine. It crystallises in the form of small scales, which are soluble in hot water and alcohol.

It is a very bitter and powerfully sebific. When boiled with water, it gives a resinous substance called phlorotin, CO\(_2\)H\(_2\) O\(_3\) and grape sugar.

If phlorizin moist be exposed to atmospheric air and ammonia it forms a deep red substance, soluble in ammonia, and which is precipitated from the solution by the addition of the same quantity of ammonia as eight equivalents of oxygen and two of ammonia. This is phlorizin.

Phlobatine, CO\(_2\)H\(_2\) N O\(_3\), is formed from phlobatic acid by ammonia.

Phlobatic acid, CO\(_2\)H\(_2\) O\(_3\), N H\(_2\) O, obtained from the action of nitric acid on chlorides of phlobatine.

PICOLINE, C\(_4\)H\(_7\) N, is a volatile oily base, isomeric with aniline, and found in coal tar. It has very powerful basic properties, and forms the same substance as the odorous described by Unverdorben.

Picolinic Acid = Carboxylic Acid = Nitropropionic Acid = Nitrophenolic Acid, C\(_4\)H\(_7\) N O\(_3\) + H O, formed by the action of nitric acid on aniline, indigo, salicine, salileye, salicylic acid, hydrate of phylene, common silk, and other substances. However obtained it assumes a crystalline form, and is of a pale yellow or white. It has a very bitter taste, and is said to take effect for alleviating bitter beer. It is fusible and volatile, readily uniting with bases; its salts crystallise and explode when heated.

Picrolaxine, a bitter principle obtained from the seeds of M. coccuta (Coccuta Indica). It forms white crystals on evaporation, and appears to be a vegetable base containing nitrogen.

Pine=Picric, C\(_4\)H\(_7\) N O\(_3\), is yielded by the distillation of the product obtained by acting on oil of bitter almonds with sulphuret of ammonia. By the action of nitric acid it is converted into trinitropicryl C\(_4\)H\(_7\)NO\(_3\) + N O\(_3\) which is a yellow crystalline powder.

Pine Apple Flavor. [Butyl.]

Pothacrine, a crystalline compound found in Bengal opium.

Pophene, C\(_4\)H\(_7\) O, a compound homologous with acetone. It is formed when propylate of baryta is exposed to heat. When oxidised it yields propylic acid. It is a volatile oily fragrant liquid, which forms a crystalline acid.

Ponyle, CO\(_2\)H, a compound hypothetical radical. Some of its compounds are known, but not its ether or its alcohol. Propylic acid, C\(_4\)H\(_7\) O + H O, is however well known, and has this radical for its base. This acid is next above acetic acid in arrangement, and is procured by heating the cyanide of ethyle with a solution of potash in alcohol. Propylate of potash is thus obtained, which must be distilled with sulphuric acid, when propylic acid passes over. It is an oily acid, and its salts have something of a fatty character.

Praherine. [Pareine.]

Rhodosertine, C\(_4\)H\(_7\) O\(_3\), an acid found in Jalap. It has the property of striking a fine red colour with sulphuric acid. When combined with bases, it takes up an equivalent of water, and is then called hydrachrodosertine. When acted on by hydrochloric acid, it is resolved into glucose and an oily substance called rhodoterine. In this respect rhodo-

Sertine resembles salicine and phloridzin.

Romane, C\(_4\)H\(_7\) O\(_3\), a yellow crystalline acid found in madder (Rubia tinctorum).

Rubin acid, a red acid obtained from catechines, and tanninaceous acid. [Catechene.]

Rubin acid, a red acid obtained from catechines, and tanninaceous acid. [Catechene.]

Rubine, O\(_3\), an acid found in Jalap. It has the property of striking a fine red colour with sulphuric acid. When combined with bases, it takes up an equivalent of water, and is then called hydrachrodosertine. When acted on by hydrochloric acid, it is resolved into glucose and an oily substance called rhodoterine. In this respect rhodo-

Sertine resembles salicine and phloridzin.

Sonne, an active principle found in the Saponaria officinalis. Although this plant is apparently inactive, this principle is a powerful stimulant, and has a sweet and acid taste. It is soluble in water, and when agitated it froths like soap. Saponaria was formerly used as a detergent.

Sonnolene, a compound formed by the action of seleni-

Selenuretted hydrogen on asdialdehydeammonia.

Sorbarose, a sweet principle, obtained from the Polygala Senega. It acts as a sedative.

Simpoline, C\(_4\)H\(_7\) N O\(_3\), a base obtained from oil of mustard by the action of the moist hydrated oxide of lead.

Simpolamine, C\(_4\)H\(_7\) N O\(_3\), a base obtained by acting on Thio-

Sipatline, C\(_4\)H\(_7\) N O\(_3\), by any oxide of lead or mercury when the latter loses all its sulphur, and a portion of its
hydrogen, and sianamine is left. It forms definite compounds with chlorides of mercury and platinum.

**Synaptase**. C₄H₈O₈, one of the three solids which, according to Kane, exist in combination in addition to Erythroline, which is a red fluid. The other solids are Aosolitmine and Erythroline.

**Styline**, C₄H₈O₈, one of the products of the decomposition of the compounds of benzoyl. It is formed from the hydrol of C₄H₈O₈ and is a permitted further, when it is heated, gives off sulphuretted hydrogen, and at last distills over, in nearly scales, stilbene. It forms a compound with chlorine when this gas is passed through melted stilbene. Bromine also combines with stilbene, forming bromide of stilbene, the substitution of nitric acid, nitrosidobenzine, nitro-stilbene, and nitro-sulphuric acid.

**Synaptoine**, C₄H₈O₂, is a substance procured from liquid starch, by distillation with carbonate of soda. At the same time it yields ammonium of soda and emulsin, C₄H₈O. It is probable from this fact that styrole and cinnacone are the same substance. Styracine may be regarded as a compound of cinnamic acid, C₄H₈O₂, with the oxide of a compound radical, C₄H₈, which is called styrole. If styracine be heated with a solution of potash, a cinnamic of potash is left, and a hydrated oxide of styrole distills over. This substance exists in two forms, as a solid and as a liquid, and has been described under the name of styrone.

**Syrhythm**, C₄H₈O₂, the hypothetical radical of sucrine acid, and is not to be confounded with the well-known syrhythm of the formula C₄H₈O₂ + H₂O.

**Sianamine.** [Jamardine.]

**Synaptase** = *Emulrin*. The white part of both sweet and bitter almonds is principally composed of a peculiar matter, which, in the water, in which it has been called syrnaptase by M. Robiquet. It appears to be identical with a substance desribed by Liebig and Wöhler, and called by them emulrin. Robiquet prepared synaptase by submitting sweet almonds, from which all the oil had been expressed, to maceration for two hours, and then subjecting them to pressure gradually increased. The filtered liquid holds vegetable albumen in solution which may be thrown down by acetic acid, also gum which may be precipitated with acetate of lead. The liquid now contains acetate of lead, acetic acid, sugars, tannin, and a small quantity of lead may be left over, sulphuretted hydrogen, and the synaptase by alcohol. The synaptase should be washed with alcohol, and dried in evers over sulphuric acid. The dry synaptase is a yellowish white opaque horny mass, which is very soluble in cold water. Iodine produces in the solution a rose color. The synaptase soon decomposes in solution, deposits a white precipitate, and acquires a mouldy odor. It coagulates at 140°, like albumen. It contains asote and produces ammonium. The following are the results of two analyses of this substance by Dr. R. D. Thomson, and Mr. Richardson.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Carbon</th>
<th>Hydrogen</th>
<th>Oxygen</th>
<th>Nitrogen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>40/025</td>
<td>7/788</td>
<td>24/377</td>
<td>18/910</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>48/555</td>
<td>7/677</td>
<td>19/742</td>
<td>100/000</td>
</tr>
</tbody>
</table>

100/000 100/000

The action of syrnaptase on the amygdalin of the almond is very singular, and throws light on the way in which the oil of bitter almonds is formed in some of the seeds of the almond-tree. "On mixing a solution of 10 parts of amygdalin in 100 parts of water, a particular decomposition immediately takes place; the mixture becomes opaqueless without any turbulence; a certain density; sequence of bitter almonds, and gives on distillation hydrocyanic acid and hyduret of benzoyl with the vapour of water. The residue is rendered turbid by coagulated synaptase, and on continuing the evaporation, a very sweet liquid is obtained, which contains crystallizable sugar. After depositing the sugar by fermentation, a fixed acid remains in the residue. The quantity of sugar obtained is more considerable than what the elements of the amygdalin could produce; it would appear, therefore, that the substance of which the amygdalin is composed is capable of undergoing a decomposition different from its formation. The decomposition is not complete unless the amygdalin and synaptase are dissolved in a proper quantity of water; if it is insufficient to dissolve the hyduret of benzoyl liberated, a corresponding quantity of amygdalin remains insoluble. (Taub.) The two constituents of the bitter almond are the fixed oil, which is separated by expression, and the synaptase and amygdalin, the two last in such a condition that they cannot re-act upon each other. When the almond cake is treated with boiling alcohol, the amygdalin is dissolved out, and the synaptase coagulated. When the cake is moistened with water, the odours of hydrocyanic acid, and of the essence, are immediately perceived, but the cake must be diffused through a certain quantity of water, in order that the mutual action of the synaptase and amygdalin may be complete, and that the whole of the last may disappear. In preparing the distilled water of bitter almonds of pharmacy, M. Liebig recommends that a mixture of 1 part of liquid extract of inkomagne, and 4 parts water, be left to itself for twenty-four hours before submitting it to distillation. One atom of amygdalin contains the elements of (Liebig):—

1 equiv. of hydrocyanic acid   C₄H₈N₈O₄
2 equiv. of hydroxet of benzoyl C₄H₈O₄
equiv. of sugar               C₄H₈O₈
2 equiv. of formic acid       C₄H₈O₄
7 equiv. of water             C₄H₈O₈

I equivalent of amygdalin C₄H₈O₄N₈

One hundred parts of amygdalin are said to yield 47 parts of the crude essence of bitter almonds, and these 47 parts to contain 59 parts of free hydrocyanic acid. The last acid is not indicated by nitrate of silver added to a solution of the crude essence in water, owing to the presence of the oil; to obtain a precipitate of cyanide of silver, ammonia-nitrate of silver must be used, and the ammonia saturated with nitric acid, after the lapse of some time." (Graham's Chemistry.)

**Syrmaptase** has hitiered a principle, found in the common lilac (Synrhga vulgaris).

**Tannactine**, a non-oxitised vegetable principle, obtained from the Tannacostum vulgar, the common tansy. It is a brownish yellow crystalline compound, obtained from the Tongphoriae semen, a poisonous ree in Madagascar.

**Tartaric Acid**, C₄H₆O₆ + 2 H₂O, and Tartaric Acid, C₄H₆O₆ + 2 H₂O, two acids obtained from tartaric acid. By long contact with water their salts are converted into tartarates and tartaric acid.

**Tartaninamine**, C₄H₈O₄S₂, a compound described by Anderson. It is obtained from nuxomine by the action of nitric acid of moderate strength. It forms small white crystals, which are sparingly soluble, and which present a crimson red colour when heated with sulphuric acid.

**Tobramyammon**, C₄H₈N₈O₄M⁺, a compound described by Tropman. It is obtained from nuxomine by the action of nitric acid of moderate strength. It forms small white crystals, which are sparingly soluble, and which present a crimson red colour when heated with sulphuric acid.

**Tobramyammon**, C₄H₈N₈O₄S⁺. When ammonia is added to the pure oil of mustard, C₄H₈N₈S⁺, this substance is formed. It is crystalline, acts as a powerful base, and yields a variety of interesting compounds. [See below.]

**Toluene**, C₄H₈N₈O₄M⁺. When ammonia is added to the pure oil of mustard, C₄H₈N₈S⁺, this substance is formed. It is crystalline, acts as a powerful base, and yields a variety of interesting compounds. [See below.]

**Toloxalic acid**, C₄H₈O₄S⁺, corresponds with hemic acid.

**Uryase** [fuslyx].

**Ustyl**, C₄N₈O₂, is the hypothetical base of the various compounds obtained from uric or lithic acid. This base is also known by the name of Cymozams acid, as it contains the elements of 2 equivalents of oxalyl, and 2 of cyanogen.

The following table will show the relation of this substance to the various compounds derived from uric acid:—

<table>
<thead>
<tr>
<th>Substance</th>
<th>C₄N₈O₂⁺</th>
<th>C₄N₈O₈⁺</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uric acid</td>
<td>C₄N₈O₂⁺</td>
<td>C₄N₈O₈⁺</td>
</tr>
<tr>
<td>Alloxantine</td>
<td>C₄N₈O₂⁺</td>
<td>C₄N₈O₈⁺</td>
</tr>
<tr>
<td>Alloxamine</td>
<td>C₄N₈O₂⁺</td>
<td>C₄N₈O₈⁺</td>
</tr>
<tr>
<td>Uryate</td>
<td>C₄N₈O₂⁺</td>
<td>C₄N₈O₈⁺</td>
</tr>
<tr>
<td>Dihydrurate</td>
<td>C₄N₈O₂⁺</td>
<td>C₄N₈O₈⁺</td>
</tr>
<tr>
<td>Diacidine</td>
<td>C₄N₈O₂⁺</td>
<td>C₄N₈O₈⁺</td>
</tr>
<tr>
<td>Hydruurate</td>
<td>2(C₄N₂O₄O⁺)</td>
<td>2(C₄N₂O₄O⁺)</td>
</tr>
<tr>
<td>Nitrohydrate</td>
<td>C₄N₈O₂⁺</td>
<td>C₄N₈O₈⁺</td>
</tr>
<tr>
<td>Umylate</td>
<td>C₄N₈O₂⁺</td>
<td>C₄N₈O₈⁺</td>
</tr>
<tr>
<td>Thionoacid</td>
<td>C₄N₈O₂⁺</td>
<td>C₄N₈O₈⁺</td>
</tr>
<tr>
<td>Valerolanic acid</td>
<td>C₄N₈O₂⁺</td>
<td>C₄N₈O₈⁺</td>
</tr>
</tbody>
</table>

**Valerolanic acid**, C₄H₈O₄ + H₂O, is classified in nature, in 4 parts of valerian, obtained from the Valeriana officinal. It is obtained from cat in oil, and sperm oil combined with the oxide of lime. It also occurs in various fats and oils from the animal kingdom, and in the seeds of the guilder rose (Fibarium Opulae). **Valerate of the oxide of Ribile** is a fragrant ether, and is
found in plants, giving a peculiar scent to those which possess it. It combines with various other bases. The compounds of valerian, as far as they are known, are homologous with those of methyl, ethyl, formyl, and acetylic.

**Xylochin, C\textsubscript{6}H\textsubscript{10}O\textsubscript{5}NO.** When potato starch is rubbed up with strong nitric acid, the starch is dissolved, and a yellow liquid is produced from which water precipitates the compound called xylochin. It resembles in some of its properties the homologous gum, but it contains so large a quantity of nitric acid that it is explosive.

The following works may be consulted on the subject of the present state of Organic Chemistry:—Gregory’s Handbook of Organic Chemistry; M. de Chenu, Elements of Chemistry; Chem. & Met. Cyclopedia, edited by Graham; and Lechmann’s Physiological Chemistry, translated by Day for the Cavendish Society; Gmelin’s Handbook of Chemistry, translated by Watts for the Cavendish Society; Bowman’s Medical Chemistry; Turner’s Elements of Chemistry, edited by Liebig; and Graham’s Elements of Chemistry.

**CHERT,** a variety of quartz being a kind of granular Chaledony. It is a transition from the softer forms of Quartz to Hornstone. [Aeol.]

**Chem. & Met. Cyclopedia.**

**CHIGWELL.** [Essex.]

**CHILDREN, JOHN GEORGE,** was born on the 18th of May, 1777, at Ferox Hall, Tonbridge. From the Grammar school at Tonbridge, he proceeded to Christ Church, Oxford, in 1794, entered Queen’s College, Cambridge, as a fellow-commoner.

He studied with a view to the church, but the early death of his wife led him to travel in the south of Europe and in the United States, from whence he returned to devote himself to chemical pursuits.

While studying mineralogy, chemistry, and galvanism, he made the acquaintance of Davy, Wollaston, and other leading men of science. In 1807 he was elected a Fellow of the Royal Society. In the following year he contributed a paper to the ‘Philosophical Transactions,’ on some experiments performed with a view to ascertain the most advantageous method of constructing a voltaic apparatus, for the purposes of chemical research, in which he determined the effect of unequal paper, which he covered with the guano, the contents of which vary from four to five feet in height; and the walls of the island, which present a series of many, the nearest of which is at a distance of eight miles.

**Chinese, the**

**Chinese.** The British and French forces continue to hold possession of Canton. Commissioner Yeh was captured on the 5th of January, 1859, and also the Tartar general.

**CHINCHAS.** Island of Pique, on the coast of Peru, lies between 13° and 14° S. lat., 76° and 77° W. long. They are naturally bare rocks, without a sign of vegetation of any sort, but they have obtained great remarks, the rocky inequalities of the original surface having been filled up and covered with the guano, the contents of which vary from fifty to one hundred feet in height; the sides of the island, which is about three miles in width, are separated by channels from one mile to two miles broad. In their general form they are all alike. On the eastern side they present a perpendicular wall of rock, from the top of which Descanso, a Gentleman, in 1815 by a paper, published also in the ‘Philosophical Transactions,’ ‘an account of some experiments with a large voltaic battery,’ in which a further series of singularly interesting results was described, among them the conversion of iron into steel by union with nickel, under the same conditions, as the voltaic apparatus.

Between the dates of these papers Mr. Children travelled in Spain, and visited the quicksilver mines of Aímadén, then but little known in England. In 1816 he was appointed one of the professors at the University of London, and at that time was elected secretary of the Royal Society, and resigning the following year on account of ill health, was re-elected in 1830, and retained the office for seven years. In 1839, on the death of his third wife, Mr. Children resigned his post at the British Museum. He died on the first day of 1852.

**China.** In the previous Supplement, under the head **China,** an account is given of the last war between Great Britain and China, from its commencement in 1840 to its termination in 1842. In this Supplement, as well as of the events which preceded the war, and the treaties by which it was followed. The forts in the Canton river were attacked and taken, and a large number of war-junks burned. Lord Elgin was sent out as Her Majesty’s commissioner, with a fleet and troops, for the purpose of entering into negotiations with the Emperor of China. Meanwhile the British had broken out in Hindostan, most of the troops went from England were required to assist in quelling it, and the quarrel with the Chinese remained unsettled. As however the dispute was confined to Canton and the authorities there, especially the French, had resolved to attack the forts of Canton. This operation was successfully performed in the morning of the 29th of December, 1857, when the principal batteries were taken, and the greater part of the defences of the city were taken possession of. The assault was conducted by Major-General Van Straussen, commander-in-chief of the British troops in China, with about 4000 men, assisted by Rear-Admiral Sir Michael Seymour, commander of the British naval forces, and by Rear-Admiral Sir Rigaud de Genouilly, commander of the French naval forces, with about 1500 men. The British and French forces continue to hold possession of Canton. Commissioner Yeh was captured on the 5th of January, 1859, and also the Tartar general.
longer than the calyx, the filaments densely-bearded. It is a native of Brazil, in woods at Almeida and Serradas, on the mountains of Bahia, and at the port of St. Catherine.

C. odorata, Sweet-Scented Snow-Berry, has ovate acuminate leaves; stipules very broad, short, each ending in a short point; racemes panicked; corolla not quite three times longer than the calyx teeth. It is a native of Brazil in woods, French Guyana, Trinidad, Perú, Cuba, and on the Spanish Main.

In 1819 Mr. Clark undertook to complete the Thames and Medway Canal, a work which had been stopped for want of capital, and under his direction it was finished some years afterwards; and the great tunnel through the Furdybore hills, through which the bridge was passed, was the suspension-bridge over the Thames at Hammersmith, which was commenced in 1824 and finished in 1827. It is chiefly remarkable for the small deflection of the chains between the chord-line or points of suspension. The suspension-bridge at Marlow was also designed by Mr. Clark, and he was employed by the late Duke of Norfolk to build one over the Arun.

Mr. Clark was however best known by the suspension-bridge which he constructed across the Danube at Pest. It was begun in 1859 and finished in 1849, at a cost of 622,000 L. At times the bursting of dams and the pressure from accumulated ice in the winter threatened a total stoppage of the works, but all obstacles were overcome by the energy of Mr. Clark. He was a remarkable monument of his genius and skill.

Mr. Clark was elected a Fellow of the Royal Society in 1837; he was a Fellow also of the Astronomical Society, and a member of the Institution of Civil Engineers. He died September 26th, 1857.

CLARKSON, THOMAS, was born March 26, 1790, at Wisbeach, Cambridgeshire, where his father, who was a clergyman, was master of the free grammar school. He was at first intended for the church, but his father had, when he was sent to St. Paul's School, London, and thence to St. John's College, Cambridge, where he gained the first prize for a Latin dissertation proposed for the middle bachelors. In the following year, 1755, the Vice-Chancellor of the University anointed another essay on the same subject, 'Anne liceat invitio in servitutem dare?' ('Is it right to make slaves of others against their will?'). The prize was awarded to Clarkson for his essay, which was read with great applause in the Senate House, in June, 1786. He had used much industry in collecting materials for this dissertation, and had become greatly excited by what he had read of the miseries to which the slaves were subjected in the carrying on of the trade. He resolved to use all his efforts to get its suppression. He was appointed an assistant of the church or chapel of ease. The ministers of these districts are usually denominates incumbents, not being parsons and vicars, properly so-called. The Church Building Commission, although by the original Act limited to ten years, was from time to time extended; and the Church Building Commissions, which have been recently transferred to the Ecclesiastical Commissioners.

CINCHOVATINA. [CHEMISTRY, S. 1.]

CHINMADRON, a genus of plants referred to Von Martius's doubtful order Cannadina. This genus has been separated from Canadina, which is well represented by C. alba, a common West Indian aromatic shrub, with everlasting coriaceous obovate alternate stalked leaves, no stipules, and coryms of purple flowers. C. alba is often called Wild Cinnamon in the West Indies, on account of its warm aromatic fragrant properties. There is but one other species of Canadina. Cinnamomadron has but one species, C. axillare. It is a Brazilian tree with aromatic properties. Its bark is used as a tonic and stimulant. It is administered in low doses and relaxed sore throat.

CINNAMON. [Sun-Brass.]

CLAIM IN CHANCERY. [Equity, S. 2.]

CHALAM. [Barbery.]

CLARK, WILLIAM TIERNEY, a civil engineer, was born at Sion House, Somersetshire, August 23, 1783. He was apprenticed when very young to a millwright in Bristol, and followed the trade for several years in that city and at Coventry. He removed to London, and entered the service of the late Mr. Rennie as draughtsman; and held the employment till 1811, when he was appointed engineer of the West Midlands Waterworks. The establishment was at that time on a very small scale—an engine of twenty-horse power supplying the neighbouring hamlets from an insufficient reservoir, yielding no profit to the company. But under Mr. Clark's advice the works were enlarged, and he spared no exertion to render them complete and effectual, until at last there were three pumping-engines of the aggregate power of 243 horses, and reservoirs capacious enough to contain from 30 to 40 million gallons, and producing an annual rental of nearly 70,000 L. This post he retained for the remainder of his life.

But the exertions of Clarkson and his supporters, who had now become numerous, did not terminate with the suppression of the trade in slaves. The struggle was afterwards continued during another twenty years for the total abolition
CLAY, HENRY, was born in Hanover county, Virginia, April 12, 1777. He was the seventh son of a clergyman, who died when Henry was very young, leaving his widow and only four of her seven children. He was brought up on the common school education. Henry obtained a situation as copying clerk in the chancery court of Richmond. Here he probably received a certain amount of initiation in legal proceedings, although he was not of age. When he formally commenced the study of the law, he was then only twenty admitted to practize at the bar. The tide of migration was then setting strongly westward, and the young advocate thought that the fertile valleys of the west offered a fairer field for his exertions. He consequently removed to Lexington in Kentucky, and there, in October 1799, he fairly commenced his legal career. As an advocate he quickly achieved a marked success. Young Clay, it was soon seen, not only possessed great natural ability and doubled its value by constant diligence, but had the more marketable talent of knowing how to manage a jury. Yet though he found himself on the road to fortune, his ambition was directed rather towards political than professional success. In 1802 he again put forth his claim to the seat of the state for the state of Kentucky. Clay, soon after, obtained an appointment as a clerk in the General Assembly of Kentucky, of which he was chosen speaker; an office he held till he was in 1811 re-elected for an unexpired term of three years. His political career was now fairly begun, and for nearly fifty years his life may be said to have been devoted to the service of his country. His first election to Congress was in 1806, but it was only for the remaining portion of a term; and in 1807 he was again elected to the General Assembly of Kentucky, of which he was chosen speaker; an office he held till he was in 1809 elected for an unexpired term of two years to the Senate of the United States. In 1811 he was sent as a representative to Congress, and on the meeting of the House of Representatives he received the very remarkable honor of being elected speaker, though he was now for the first time a member of the house. But his speeches in the Senate, and his conduct as speaker of the Kentucky Assembly, had established his reputation; and so well satisfied were the people with his choice, that he was re-elected for re-election to that body in 1814. In both his previous efforts he had taken a prominent part in the great questions of the day, but especially distinguished himself by his earnest denunciations of the English claims to right of search and other maritime privileges, and by his active and unceasing efforts to aid the suffering of the people in the war with England, so during its continuance he remained one of its strongest advocates. He was in 1814 appointed, avowedly in consequence of the leading part he had taken in the discussions on the war, one of the commissioners to negotiate the treaty of peace. On his return to America he was at once re-elected to Congress.

He now directed his energies to home legislation; but when the question of South American independence was before the Senate, he was unexpected, Clay was already promulgating his favorite idea of the emancipation of every species of European antimony from the American continent. While engaged in a decided course of political activity, he continued to maintain the same liberal policy, and there were two great measures which specially occupied his mind. One was the establishment of a national system of internal improvements, which the president opposed as unconstitutional, but which Clay successfully vindicated from that objection; and a re-establishment of a national bank. Both of these measures were carried, and the successful issue of his exertions placed Clay in the estimation of a large portion of his countrymen in the very first rank of American statesmen. He was now looked to by many as the probable heir of the presidency, and it was well understood that he himself coveted that elevated post. That he might be in a better position to bear the increased expenditure its acceptance would necessarily involve, he resigned in 1819 his seat in Congress, and returned to the active pursuit of his profession, in which he promptly regained a highly lucrative practice. But when the conventions began to consider the claims of the candidates for the presidency, it was apparent that Clay would not be chosen; his name was soon withdrawn. With this he went to the House of Representatives, by whom he was immediately restored to his place as speaker. Three candidates went to the vote for the presidency, but as neither could obtain the absolute majority required by law, the election was again placed to the House; and Clay, because of his influence in favor of Adams, was chosen; and in return appointed Clay secretary of state. This office he held until 1827, and during his occupancy of it discharged its duties with great ability.

On the election of General Jackson in 1829, Clay retired for awhile into private life, but in 1831 he was elected to the United States Senate. In 1833 Clay was again an unsuccessful candidate for the presidency. He had now to consider that the subject of his protracted and arduous career was re-opened, and the country was agitated from end to end. South and north were almost in open conflict. At length Clay brought forward his 'Compromise Bill;' it was accepted by both parties, and modified protection to national interests became the established law of the United States. His subsequent tour through the middle and eastern states was a continued triumph. Passed over at the presidential election of 1836, at that of 1839 his claims were more strongly urged. Clay had put forth his candidature, and the subject was re-opened, and the country was agitated from end to end. At the presidential election of 1844, the great man was again united. The events of 1828 had been a great shock to the Democratic party, and Clay was elected. Clay remained a member of the senate till 1842, when, finding that his strength was insufficient to sustain him in his arduous task, he withdrew, and the other side of the chamber and the office of Speaker were taken up by Polk. But the time was now approaching when Congress would have to consider the question of the nullification of the act of 1832, and the necessity for such an act, which would be a great blow to the cotton interests of the United States, and a great shock to the southern states. Clay was elected in 1849, when he was again returned to the Senate. To him was due the famous slavery 'Compromise Act' of 1850, which for a brief space quieted the bitter strife which the question of slavery had so long agitated in the country; and Clay lived long enough to perceive that as a permanent measure his project was a failure. He had laboured beyond his strength in an effort to establish the supremacy of the union in the South, and that union was longed for rest. But his was not to be a rest on earth. He resigned his office as senator, but before the day named for his resignation to take effect, he had ceased to live. He died June 29, 1852, aged 76. Henry Clay was undoubtedly a man of powerful intellect, but he will hardly retain the rank which his contemporaries too readily assigned him.
was wanting in comprehensiveness. His views were at best too strictly national, and, as in the case of the protective tariff, and in his general foreign policy, he too readily took for granted that what seemed to give an advantage to his countrymen was really for their benefit in the large view of the world.

CLINKSTONE, a grayish blue rock, consisting principally of Felispar. It passes gradually into gray basalt, but is distinguished from that rock by its lower specific gravity. When struck with a hammer it rings like iron. It is frequent in various localities.

CLINTON, HENRY FYNES, was born January 14, 1781, at Gamston in Nottinghamshire. He was the eldest son of the Rev. Charles Fynes Clinton, D.D., prebendary of Wem, chaplain of St. Mary's, and son of the 1st Viscount Clinton, and was descended in direct line from Henry, second earl of Lincoln. The family name was Fynes till his father obtained a royal licence, April 26, 1821, to resume the ancient family name of Clinton.

Mr. Clinton was educated at Southwell School, Nottinghamshire, where he remained from 1789 till 1796, and was well grounded in the classic languages. In September 1796 he was removed to Westminster School, where he remained till Easter 1799, not on the foundation. In April 1799 he was removed to Emmanuel College, Cambridge, and remained there till 1806. He graduated B.A. in 1803, and M.A. in 1805.

At the general election of 1800 he was returned M.P. for Abergavenny, borough, in which capacity he continued till 1806, and continued to be one of the representatives of that borough till the dissolution of 1826, after which he was succeeded in his seat by his next brother. He was diligent in his parliamentary attendance, but was not a speaker. In his politics he was a rigid conservative.

Besides being a classical scholar of the highest class, he read carefully all the best works of the Greek and Roman writers with a diligence perhaps unexampled, at least in modern times. He himself states, that while at Oxford, during less than seven years, he read 3253 pages of the Greek poets and historians and philosophers. The last after he had left Oxford in 1829, he read about 40,000 pages; the reading at Oxford amounting to 746 pages annually, while the reading during 1810-20 amounts to 4000 pages annually, which is at any rate more than five times greater.

Mr. Clinton's two great works, the 'Fasti Hellenici' and 'Fasti Romani,' have a European reputation, and are literary works of which every classical scholar of Great Britain may well be proud. The 'Fasti Hellenici' (the 'Civil and Literary Chronology of Greece', 3 vols. 8vo, Oxford, was commenced in 1810, and was published in four separate volumes in 1824, 1827, 1830, and 1834; but the work is now divided into 3 vols., which are sold separately—vol. i. extending from the earliest accounts to the 50th Olympiad, vol. ii. from the 50th to the 124th Olympiad, and vol. iii. from the 124th Olympiad to the death of Augustus. Besides the chronological tables, of which these volumes for the most part consist, they are interspersed with dissertations on the early inhabitants of Greece, the Homeric myths, the value of their poetry, and the influence of Homer, the popular poet, and the formation of the ancient alphabet. The 'Fasti Romani' (the 'Civil and Literary Chronology of Rome and Constantinople, from the Death of Augustus to the Death of Heracles'), 2 vols. 4to, Oxford, was commenced in 1815, and published in 1836. These works have been published in the Gentleman's Magazine. An Epitome of the Civil and Literary Chronology of Greece, from the earliest Accounts to the Death of Augustus, 8vo, Oxford; and in 1853 appeared 'An Epitome of the Civil and Literary Chronology of Rome and Constantinople, from the Death of Augustus to the Death of Hencius,' 8vo, Oxford: two abridgments which are very useful to those students who cannot afford to purchase the larger and more expensive works.

(From the Life of H. F. Clinton, edited by C. J. F. Clinton, 1864; Gentleman's Magazine.)

CLONES. [Mon Ashan.

CLOWES, WILLIAM, printer, was born at Chichester, January 1, 1779; died January 26, 1846. The father of Mr. Clowes was clerk at Oxford, and kept a large press at Chichester; but he died when the subject of this notice was an infant, leaving his widow to support two children with strainedal means. She was enabled, by keeping a small press on a small scale, to remove her children from Chichester to London, where she apprenticed to Mr. Seagrave, a printer at Chichester.

He came to London in 1802, and worked as a compositor with Mr. Teape, of Tower Hill. In 1803 he commenced business on his own account in Villiers-street, Strand, on a capital of 350l. He purchased one press, engaged one assistant; and, after working as a compositor through the day, would often, for two or three consecutive nights, sit up, to press, at the charge of his stock of type free for the next day's demand. It was this energy of character that raised Mr. Clowes to his subsequent position as one of the proprietors of the 'Literary London.' He migrated at the age of twenty-four, a cousin of Mr. Winchester, who had much government business; and by him was recommended for important official work. The name of his wife, Miss Alice, was derived from the name of his patron; and he brought friends around him; and in a few years the humble beginner with one press bad a considerable printing office in Northumberland Street, Strand. This office was burnt down; but a larger rose in its place. In 1826 he commenced steam-printing, the principal founder of Clowes being John M. Gamston, a man of business, and the process being novel, his office had many visitors of literary reputation. Mr. Clowes was always a signal example for the honest and successful manufacturing enterprise to lead the way under new circumstances. He saw that new materials were capable of being adapted to this manufacture, and that the possibility that books might be demanded in sufficiently large numbers to make the new invention of more universal application than was at first considered probable. An action brought by the Duke of Northumberland, whose palace was close to Mr. Clowes's printing-office, to abate the steam-press as a nuisance, was successful—defended; but the printer removed his noise and his dirt, under the award of arbitrators; and the decision was a fortunate one for him. In 1826 he became the compiler of the spacious and well-known publication in Duke-street. Stamford-street. In the course of years the humble establishment of the young Sussex compositor grew into 24 steam-presses and 28 hand-presses, giving employ to 500 hands, and most complete, most perfect, most printing manufactory that had ever been in the world. The creation of literature that should at once reconcile the apparently dissimilar qualities of goodness and cheapness, through demand for books before unprecedented, gave a considerable impetus to London printing. Mr. Clowes's office and premises are described in the Gentleman's Magazine and 'The Penny Cyclopaedia' issued with undervailing regularity for fourteen years from his printing-office. Mr. Clowes was a common man. His powers of arrangement were most acute; he was at once bold and prudent. He was one of those few men who would not recognize the word 'impossible' as one to be lightly employed. He who in 1803 had a few hundred weight of type to be worked from day to day like a bankers gold, would not hesitate, in 1826, to employ the whole of his workforce in laying up and locking up for months in some ponderous blue-book. To print an Official Report of a hundred folio pages in a day or night, or of a thousand pages in a week, was no uncommon occurrence. Mr. Clowes's name will not be associated with the honours of the great classical printers, his was another ambition. He lived in an age when knowledge was to become the inheritance of the many; and he furnished the means of carrying out this literary revolution in a more efficient manner than any of his professional competitors. His name will be frequently associated with the intellectual development of our time. (National Cyclopaedia.)

CLUN, a name given to the lower and harder beds of the Cretaceous Rocks. They are occasionally used for building purposes, and are employed for the foundations of the Churches at Carnarvon, Bangor, and Chester. A large internal work in cathedrals and other large public buildings. This material stands well if not exposed to accidents from mechanical violence. (Anstey, Elementary Geology.)
CLU

COA

CLUSIANE. [OITIPINIAE.]

CLUTHALITE. [MINERALOGY, S. 1.]

COAL, an organic combination of mineral substance of a black or brown colour, and in all cases giving indications of having been derived from a vegetable source. Such is a definition that would probably include all those substances which are used in domestic economy and the arts for the purposes of the popularly termed Coal. At the same time it should be stated that the term has at present no special scientific application that is universally admitted, and each investigator thinks himself at liberty to apply the term in accordance with his own view. As the knowledge of chemical principles and methods of investigation has advanced, substances which at one time were regarded as identical have been shown to have a very different chemical composition as well as microscopic structure. This has led to some instances to the discussion of the question, What is Coal?

For instance, in our courts of law, one of the most recent cases—that of Gillespie v. Russell—was tried in Edinburgh in the year 1653. In this case, by an agreement for a lease entered into between the plaintiffs and defendants, the former agreed to grant to the latter a lease of "the whole coal, ironstone, iron-ore, limestone, and fire-clay, but not to comprehend copper or any other mineral whatever." It was alleged by the plaintiffs that, although the defendant had expended upon the premises their iron-ore and ironstone, coal, and fire-clay of workable value, they had neglected these, and had chiefly worked a certain mineral substance which the plaintiffs contended was not to let to the lessee. This was not of the mineral substances specified in the agreement. This mineral was, with much greater value, it was stated, than any which the defendants were permitted to work. Although used as a combustible material, it was alleged that this substance was not coal, and that its chemical, microscopic, and mineralogical characters were not those of coal. On the other hand, it was asserted by the defendants that the mineral in question was coal; that they had been led to seek a lease of the Torbane-Hill estate from the fact that on the adjoining lands of Boghead coal was worked, and sold as coal, being known in the markets by the name of the 'Boghead Gas Coal.' This mineral, they contended, was true coal, belonging to the variety known as Cannel or Parrot Coal. This trial was interesting on account of the large number of chemists, mineralogists, geologists, and microscopists, examined, who appeared in about equal numbers on either side; one set of them contending that the mineral was coal, whilst the others contended it was not. A large amount of interesting facts were elicited concerning the coal and the nature of the deposit, and it is found associated was laid before the jury, who came to the conclusion that, whatever might be the result of scientific investigation in more rigorously defining the nature of coal and limiting the use of that term, both plaintiffs and defendants admit that coal is a term which can be drawn up, and therefore gave a verdict in favour of the defendants.

The same question which has thus been debated in Scotland has also come before the law courts of Germany and of the United States of America with the same diversions of opinion; and we refer to these cases to show the difficulty of defining accurately this well-known substance. It may be regarded in the present state of our knowledge as one of those instances in which the typical form is lost by irregular combination with other and different substances.

That Coal is and must be of vegetable origin seems to be agreed upon by all inquirers, but the question of how to determine that origin in particular cases is the difficulty. Accepting it as a well-known principle that soil after it is subjected undergoes certain chemical changes by which substances with a very different chemical character are produced, such as bitumen, paraffine, &c., these, mixed with the coal itself and the earth, form compounds, which are usually called Coal. It is at about whose nature there may be considerable differences of opinion. This is not improbable the case with the Torbane-Hill mineral, and will account for the peculiarity of both its chemical and microscopical characters.

Coal is generally in a massive form, and is brittle or secrete. It has a hardness of 2 or 2.5, and a specific gravity of 1.2 to 1.75. It is opaque, and has a black or brown colour. Its chemical composition is distinguished by the presence of carbon; in addition, it also yields, on ultimate analysis, hydrogen, oxygen, and nitrogen. On burning it leaves an ash which consists of varying quantities of silica, alumina, and oxide of iron. The carbon and hydrogen are not found chemically united in form to bituminous compounds which are mixed with the coal. It is the presence of these compounds which causes coal to burn with a bright flame; at the same time they give off a bituminous odour. Those institutes of bituminous compounds burn with a pale blue flame, due to carbonic oxides, which is formed in these cases through the decomposition of the water present.

The following table, found on Mr. Musset's Analysis of Coal, is taken from Professor Ansted's 'Elementary Course of Geology, Mineralogy, and Physical Geography':—

<table>
<thead>
<tr>
<th>Locality</th>
<th>Description of Coal</th>
<th>Carbon.</th>
<th>Hydrogen</th>
<th>Oxygen</th>
<th>Ash</th>
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<tbody>
<tr>
<td>Newcastle upon Tyne</td>
<td>Bituminous</td>
<td>15.27</td>
<td>7.00</td>
<td>6.00</td>
<td>14.38</td>
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<tr>
<td>Lanchester</td>
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<td>6.00</td>
<td>5.00</td>
<td>20.18</td>
</tr>
<tr>
<td>Ditto, North Wales</td>
<td>Ditto</td>
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<td>5.00</td>
<td>4.00</td>
<td>24.18</td>
</tr>
<tr>
<td>Staffordshire Potteries</td>
<td>Ditto</td>
<td>23.80</td>
<td>4.00</td>
<td>3.00</td>
<td>27.18</td>
</tr>
<tr>
<td>Ditto</td>
<td>Ditto</td>
<td>26.80</td>
<td>3.00</td>
<td>2.00</td>
<td>30.18</td>
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<td>2.00</td>
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</tr>
<tr>
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<td>32.80</td>
<td>1.00</td>
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<td>36.18</td>
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<tr>
<td>Ditto</td>
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<td>35.80</td>
<td>0.00</td>
<td>0.00</td>
<td>39.18</td>
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<tr>
<td>Ditto</td>
<td>Ditto</td>
<td>38.80</td>
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<td>0.00</td>
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<td>44.80</td>
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<td>47.80</td>
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<td>68.80</td>
<td>0.00</td>
<td>0.00</td>
<td>72.18</td>
</tr>
</tbody>
</table>

The following analyses of the Torbane-Hill Mineral and Cannel Coal were presented by Dr. Pyfe at the trial in Edinburgh:—

<table>
<thead>
<tr>
<th>Locality, or name of Coal</th>
<th>Description of Coal</th>
<th>Carbon</th>
<th>Hydrogen</th>
<th>Oxygen</th>
<th>Ash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welsh Coal—</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graepia</td>
<td>1.30</td>
<td>8.27</td>
<td>3.84</td>
<td>0.41</td>
<td>0.95</td>
</tr>
<tr>
<td>Anthracite</td>
<td>1.35</td>
<td>9.44</td>
<td>4.64</td>
<td>0.42</td>
<td>1.06</td>
</tr>
<tr>
<td>Oideitecitive Pl.</td>
<td>1.09</td>
<td>7.86</td>
<td>3.04</td>
<td>0.51</td>
<td>0.95</td>
</tr>
<tr>
<td>Ward's Fiey Pl.</td>
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<td>7.87</td>
<td>2.98</td>
<td>0.50</td>
<td>0.95</td>
</tr>
<tr>
<td>Bryne Coal</td>
<td>1.30</td>
<td>8.48</td>
<td>3.84</td>
<td>0.35</td>
<td>0.95</td>
</tr>
<tr>
<td>Emosses</td>
<td>1.28</td>
<td>9.54</td>
<td>3.64</td>
<td>0.35</td>
<td>0.95</td>
</tr>
<tr>
<td>Parkinshil</td>
<td>1.18</td>
<td>8.57</td>
<td>3.85</td>
<td>0.35</td>
<td>0.95</td>
</tr>
<tr>
<td>Firthfeld</td>
<td>1.08</td>
<td>6.52</td>
<td>3.45</td>
<td>0.35</td>
<td>0.95</td>
</tr>
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<td>Hexca</td>
<td>1.31</td>
<td>8.71</td>
<td>3.85</td>
<td>0.35</td>
<td>0.95</td>
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<tr>
<td>Mysyrd Newydd</td>
<td>1.18</td>
<td>6.74</td>
<td>3.45</td>
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<td>0.95</td>
</tr>
<tr>
<td>Greens-quarter Pl.</td>
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<td>8.72</td>
<td>3.85</td>
<td>0.35</td>
<td>0.95</td>
</tr>
<tr>
<td>Vein, Fiey Rock</td>
<td>1.20</td>
<td>8.78</td>
<td>3.85</td>
<td>0.35</td>
<td>0.95</td>
</tr>
<tr>
<td>Vein</td>
<td>1.20</td>
<td>8.78</td>
<td>3.85</td>
<td>0.35</td>
<td>0.95</td>
</tr>
<tr>
<td>Gyn Nanty-g.</td>
<td>1.20</td>
<td>8.78</td>
<td>3.85</td>
<td>0.35</td>
<td>0.95</td>
</tr>
<tr>
<td>Riveccen</td>
<td>1.20</td>
<td>8.78</td>
<td>3.85</td>
<td>0.35</td>
<td>0.95</td>
</tr>
<tr>
<td>Poyt Foot</td>
<td>1.20</td>
<td>8.78</td>
<td>3.85</td>
<td>0.35</td>
<td>0.95</td>
</tr>
<tr>
<td>Redway</td>
<td>1.20</td>
<td>8.78</td>
<td>3.85</td>
<td>0.35</td>
<td>0.95</td>
</tr>
<tr>
<td>Ichve Vale</td>
<td>1.20</td>
<td>8.78</td>
<td>3.85</td>
<td>0.35</td>
<td>0.95</td>
</tr>
</tbody>
</table>
Coal differs considerably in its physical properties, and it has obtained various names in the markets. The minerologists generally divide it into two varieties—

First, Coal without Bitumen.

Second, Coal with Bitumen.

The first variety is known by the general name of Anthracite. It has however various local names, [As-]

Anthracite. It is sometimes very hard, and has a high lustre, and is often iridescent. Besides being used for fuel, it is often made into windlocks, small boxes, and other articles of use. This is especially the case with the Anthracite of Naples. It is the most common form of coal in the Welsh beds.

The Bituminous varieties of Coal present greater differences of structure and appearance, and have a larger number of names. By the above analyses it will be seen that the quantity of Bitumen, or substances resembling it (Browns), differ very much in different specimens of coal. It is generally softer and less lustrous than Anthracite, although occasionally specimens exhibit a very brilliant fracture. Its specific gravity is less than that of Anthracite, seldom exceeding 1.6, whilst the specific gravity of Anthracite ranges from 1.3 to 1.75. The kinds of this coal are known by various names.

The following are analyses of the different kinds of Coal as they occur in the Newcastlem—

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Northumberland</td>
<td>9-09</td>
<td>5-79</td>
<td>4-01</td>
<td>9-29</td>
<td>14-72</td>
</tr>
<tr>
<td>Southwick</td>
<td>9-39</td>
<td>4-79</td>
<td>5-01</td>
<td>8-29</td>
<td>9-72</td>
</tr>
<tr>
<td>Northumberland</td>
<td>1-08</td>
<td>7-00</td>
<td>4-01</td>
<td>15-29</td>
<td>14-72</td>
</tr>
</tbody>
</table>

Coal is known by its velvet or grayish-black colour. When first thrown on a fire it breaks into small pieces, but on the continued application of heat the pieces again unite into a solid mass or cake. It burns readily with a yellow flame, but on account of its caking quality it is likely to clog the fire; unless it is frequently stirred. The Newcastle beds mostly yield this form of coal.

Cherry Coal resembles in external appearance the pitch coal, and when exposed to heat it cracks and flies, but does not cake. It is very brittle, and on this account much loss is occasioned in mining it. It burns with a clear yellow flame. This kind of coal occurs in the Glasgow beds.

Split Coal is a variety found in connection with the last, and is remarkable for its hardness; for which reason it is sometimes called Hard Coal. It is found at Glasgow.

Carneal Coal has little lustre, is very compact and smooth in its texture, and breaks with a large conchoidal fracture. It is also known as a kind of pitch coal, but does not crack on heating out melting. In consequence it has been employed in the making of candles—hence its name. It is often employed for making inksands, small-boxes, and other articles of use.

At the Great Exhibition of 1851 several models of public buildings, monuments, &c., were exhibited, formed of Carbon Coal.

The above coals are those most commonly burned. Their goodness for heating is tested by the quantity of water they evaporate. The following are the results of some recent experiments—

1b. oz.

Common Scotch Bituminous Coal | 5 14

Carr's West Hartley Main (Newcastle) | 7 5

Moffat Bituminous Coal | 0

Pure Welsh Anthracite | 10 8

From which it will be seen that the heating power of anthra-

cite nearly doubles that of some bituminous coals.

"Brown Coal" of Anthracite is sometimes given to less perfect varieties than the last. Specimens of these coals have a brownish-black colour, and burn with an emphyse-

matic odour.

On playing sections of Lignite under the microscope, the structure of the wood of the plant forming it can be readily detected. This is not the case with the other kinds of coal, where, although the woody fibre can be frequently made out, it has evidently undergone considerable change. Professor Quekett has well described, projects the term to those mineral sub-ances alone which are evidently made up of the woody tissue of plants. He maintained that the Torbanite mineral was not coal, on the ground that it was not composed of the debris or remains of vegetable woody tissues. Although woody and also seen in the Torbanite mineral, Professor Quekett maintains that this has been accidentally introduced, and that no true vascular or spiral tissue is found in coal.

"Brown Coal" is frequently applied to coal more recently deposited than that of the great coal-beds of the world, and this quite independent of its structure or any peculiarity in combustion. Lignite is also a term applied to the semi-carbonised forms of wood which are frequently found deposited later than those of the coal deposits. Most of these varieties of coal contain a large quantity of water, and the quantity of matter given off at a moderate heat by distillation is at least equal to that of the carbon contained.

"Dysoxid is a yellow or grayish highly laminated sub-

stance, often found with lignite, and burning vividly, and spreading an odour of asahadetta." (Aned.)

Jet is another variety of coal belonging to the bituminous series, and occurs in elongated reiform masses, and sometimes in the form of branches with woody structure. It is soft and brittle, with a conchoidal fracture. Its specific gravity is but little greater than that of water. It is opaque, of a violet-colour, and has a brilliant and resinous lustre. It is found in Saxony, and also in the Prussian amber-mines in detrital fragments. It is sometimes washed up on the shores of Great Britain. The finer sorts are used in the manufacture of ornaments and snuff-boxes of various kinds. The coarser sorts are burned as fuel. Jet is used when burning a greenish flame and a strong bituminous smell, and leaves a yellowish ash. It contains about 57 per cent. of volatile matter.

For an account of the origin of Coal, and the beds of Coal on the surface of the earth, see Coal Formation and Coal Plants.


COCIDAE. [GALLINULAE.]

COCKBURN, ADMIRAL, THE RIGHT HONORABLE SIR GEORGE, G.C.B., who represented a branch of the same family as Lord Cockburn, was born in 1759, entered the navy in 1781. Having served in the East India, Home, and Mediterranean stations, in 1795 he co-operated with the Austrian troops in Piedmont, and took part in the capture and blockade of Leghorn. He subsequently received an appointment to command a fleet against Martinique, which resulted in that island being ceded as a British colony. In 1812 he was sent as commissioner
COC 148 COL

for reconciling Spain and her transatlantic colonies. He was com-pions in the hostilities with America in 1813 and 1814. He was a collateral of Sir Fullerton and retired from public life by a sister of the wife of the first Viscount Melville, and represented an ancient Scotch family which has produced many distinguished members. He was born in 1770, and called to the bar in 1806 in the same family prominent in Scotch law, belonging to the Tory school, but although the Scotch patronage of the crown for many years was dispensed by Lord Melville, Mr. Cockburn in early life adopted liberal opinions. It was not until November 1830 that any high legal position fell to Mr. Cockburn, when he became solicitor-general for Scotland, upon the promotion of Jeffrey to the attorney-generalship. He had however long before this time been to considerable eminence in his profession, and was particularly distinguished for the ability of his advocacy, and he took an active part in the prosecution of the Cato affair. Among other cases in which he was engaged may be particularly mentioned that of the Queen'sberry trial, in which considerable property was at stake. He had also brought before the House of Lords, the act "annulling the charge drawn up by Mr. Cockburn against the observation of the bench, and even as a young man his papers on feudal law had met with general approval.

Such a man as Cockburn could not long remain without reaping a more permanent reward than the solicitor generalship. Accordingly in 1834 he was promoted to the Scottish bench as one of the lords of session, to which three years later was added the further appointment of a lord commis- sant of the admiralty, in which he remained till he was surpassed by few in his clear enunciation of law, and in his charges to juries. He was distinguished by a skilful detection of whatever was false in principle or in evidence, as well as by the breadth and grasp of his legal judgments, which soon appealed to the public.

Besides the life of his friend Lord Jeffrey in 2 vols. (1852), Lord Cockburn published only one small pamphlet, which was entitled "On the best way of spoilling the beauties of Edinburgh," which was an early contributor however to the pages of the Edinburgh Review; and it is said that an article from his pen in that review was mainly instrumental in causing a reform in the method by which Scotch juries had been previously chosen.

As a friend, neighbour, and citizen, no less than as a relative, Lord Cockburn was beloved. His death, which happened April 26, 1854, while he was on circuit at Ayr, was preceded by an illness of but a few days' duration. He left a large family by his widow, who is sister of the wives of the late Scotch judges, Lords Fullerton and Dundas, etc.

COD-FISH. [Monnkhur.]

CODEIA. [Chemistry, &c.]

CODRINGTON, SIR EDWARD, ADMIRAL, G.C.B., was born 1784. In 1806, when he was appointed to the command of the Orion, 47, and was engaged in the battle of Trafalgar. For his ser-vices in this victory he was rewarded by a gold medal. He left the Orient on 25 December, 1806, and in November, 1808, he was appointed to the Palisado, and on the latter ship he sailed under Lord Gardner in the expedition to Walcheren, and was thanked for his services in forcing the Schelde, in August 1809. In 1810, 1811, and 1812, Captain Codrington was on the Channel fleet, attended the defence of Cadiz and Tarragona, and in co-operating with the Spanish patriots in Catalonia. In January 1813 he returned to England.

In 1814 Captain Codrington sailed to North America, and while there was promoted to the rank of rear-admiral, and was appointed captain of the fleet under Sir Alexander Cockrane. He took part in the attack on New Orleans. At the conclusion of the war with the United States he returned to England, and in 1815 he was created a knight commander of the Bath, January 2, 1815. He attained the rank of vice-admiral July 10, 1821.

Sir Edward Codrington was appointed, November 1, 1826, commander-in-chief of a squadron in the Mediterranean destined to observe the Turkish fleet, and hoisted his flag on board the Asia, 84. He was joined by a French and a Russian squadron, and the battle of Navarino took place October 29, 1827; when the Turco-Egyptian fleet, consisting of 21 ships of war, was almost entirely destroyed. For his services in the battle Codrington was distinguished by the dignity of knight grand cross of the Bath; but as there was much doubt among politicians as to the propriety of destroy-ing this fleet, and the Duke of Wellington admitted that it was a "mistake," Sir Edward proceeded on parole from the Mediterranean in April 1828. In 1828 he was elected M.P. for the borough of Devonport, and was re-elected in 1835, and again in 1837. He was of liberal politics, and very popular. In 1837 he was attainted the full rank of admiral, and on the 22d of November, 1839, was appointed commander-in-chief at Portsmouth, when he resigned his seat as a member of parliament. He occupied his station at PORT-mouth for the usual term of three years. He had a good service pension of 300 l. a year. He died in London, April 21, 1851.

CÔLÈBÔGYNE, a genus of plants belonging to the natural order Euphorbiaceae. This genus was named by Mr. J. Smith from a specimen grown in the Royal Gardens at Kew. It is remarkable for the fact that being dioecious, the pistillate flowers of the male plants have ripened their fruits, which contain seed containing a perfect embryo without the presence of the staminate plants. This appears to be quite an ex-ceptional case to the law of production of the embryo by the agency of the pollen-grains of the staminate plants. Further observation may detect some hitherto undiscovered means by which the pollen-cells of perhaps an allied plant may come in contact with the pistil of the Colèbôgyne.

CÔGGESHALL, [Essex.]

COLBY, THOMAS, Major-General in the army, and one of the Directors of the Ordnance Survey, was born at Rochester, 1st of September 1784. When his father, Captain Colby, of the Royal Marines, sailed with the fleet under Lord Howe, he was sent to Dr. Crockell's school at Northfleet, and from thence he entered the Royal Military Academy at Woolwich. He obtained his first commission as second lieu-tenant of engineers in 1801, being then but seventeen years of age. His diligence and success in scientific study were such that in January of the following year, at the special request of Captain Mudge, then superintendent of the ord-nance survey, he was appointed one of the assistants in that great work. Entering at once on his duties, he justified the expectations that were entertained of him by his industry and con-scienctious activity which he brought to the work of surveying. He was on a tour of inspection in Cornwall, in 1803, when he lost his left hand by the bursting of an old pistol, and continued his labors upon the grand survey of England from a fragment of the barbel, that he felt the effects of the acci-dent for the rest of his life whenever he attempted any long-continued mental exertion. Though the loss of his hand was a hindrance to the active discharge of his duties, Colonel Colby carried on the execution of his duties to the best of his merits, that he kept the young lieutenant permanently attached to the survey.

In 1803 Lieutenant Colby was serving at Dunnone, one of the prominent points of the survey: in 1804 at Beaumaris; and in 1806 with the seventh sector at Burleigh Moor and Delamere Forest. The winter months he passed in the
He was one of the party that accompanied Biot on his trip to Shetland in 1817, when, in compliance with the King's command, he was permitted to observe on the line of the English arc. A coolness however arose between Biot and Colby, and while the latter, undeterred by fog or storm, made his observations with the sector on the rock of Balta, the former carried on his measurements on the island of Agaist; and Colby afterwards assisted in connecting the French with the English triangulation by the observations across the straits of Dover.

In 1820 Captain Colby was elected a Fellow of the Royal Society; he took an active part in establishing the Astronomical Society; and General Mudge having died, he was appointed his successor as superintendent of the Survey, and in the Board of Longitude. In 1821 he was promoted to the rank of major, and was placed on the staff of the island of Ireland. In this work the usual mode of proceeding was modified: the survey was made dependent on actual measurements with the chain, with a trigonometrical point fixed for every 400 acres; and the whole series of operations was so unitedly combined that one person became a check on the other, and the utmost accuracy was arrived at, although the number of persons employed exceeded two thousand, mostly from the native peasantry. A change was also made in the method of anchoring: the survey vessels, rather than anchors to the mile, all the principal farms, fields, and inclosures being represented, so that the maps have ever since been regarded by the government, land-proprietors, and surveyors, as authentic plans of all the estates in the country.

Frequent and laborious as the surveying works, and the Irish census, have all been based upon them. They are comprised in 1839 sheets.

In 1832 Major Colby became lieutenant-colonel, and in that year he obtained the Duke of Wellington's sanction for raising and training the most efficient and able body of men to aid in the Irish survey, as the want of really efficient assistants was felt at first as a serious hindrance to the progress of the work. In the course of the operations Colby was elected a Fellow of the Royal Society, and became a member of Lough Foyle, with 'compensation-bars' which he had himself invented. He had carried on a series of experiments on the heating and cooling of metal rods, and he succeeded in constructing a bar of brass and iron in combination, the extremities of which remained always the same distance apart whatever might be the temperature. Such is the exactitude obtained with this apparatus that it has since been used in measuring a base of eight miles at the Cape of Good Hope, in the re-measurement of the English bases in those parts of the world where no other calculations have been afforded, and in the triangulation of the great arc of India.

In 1838 Colonel Colby resumed the triangulation of Scotland, which had been suspended; and from this date up to his promotion to the grade of major-general in 1846, who he was in consequence of the service his connection with the survey ceased, he continued his usual active and energetic superintendence of the various operations. He brought the engraving of the English maps to an excellence never before achieved. The seconds of latitude and longitude were marked on the margins, and he co-operated with Sir George De la Beche in introducing the geographical facts and features which have since become so important a part of the survey. He took the necessary measures for a series of tidal observations round the coast of Ireland, for the purpose of establishing a true datum level: "the most important series of tide-observations," says the astronomer-royal, "that has ever been made."

Through all his scientific career Colby never parted from a use of his own, and his patients would in some degree be served in the hospital of industry and science, which he had so carefully established. Once, when encamped on Sliove Donard in Ireland, the summit of Sea Fell in Cumberland became visible at the distance of 111 miles, and after many trials the instrument was brought to bear upon it. "Colby was on the point of successfully finishing his observation, which would have been a grand triumph, including the longest side of a triangle ever attempted, when an officer on entering the observatory accidentally struck his elbow, and threw the telescope off the object. A momentary effusion of his tears, but though he could not again succeed, and the object was therefore lost, he never afterwards alluded to the subject."

"Drawing Room" at the Tower, computing and preparing the results for publication, and superintending the construction and sogering of the ordnance scale of 1 inch to the mile. So thoroughly was he identified with that great national work, that the history of one becomes in great measure the history of the other. In 1807 Colby was promoted to the rank of captain. The third volume of 'An Accomplishment Manual' was published in 1811, and his name appearing jointly with that of Colonel Mudge on the title-page, showed how highly his services had been appreciated by his chief. In 1815 it was determined to extend the meridian line into Scotland, a task which was specially assigned to him, in the course of which Colby was remarkable. Within the next three years he visited and observed at the principal stations beyond the Tweed, besides attending to his official business at Edinburgh. The proving labour and activity required for a season of observation on the hills would appear incredible to one unacquainted with the nature of the work. Besides the mental exercise of keeping all the subordinates to their duty, so as to produce harmony in the results, there was much personal fatigue to be endured in long walks over the country, together with storms and wearisome delays on the mountain tops. But with Captain Colby duty was paramount, and he cared not for privation, so that the work was performed in his accustomed manner. Colby's "drawings of the hills" gives a striking picture of the toils and hardships experienced: "It was no uncommon occurrence," he remarks, "for the camp to be enveloped in clouds for several weeks together, without affording even a glimpse of the sun or stars. And then, at the moment the clouds would break away or subside into the valleys, leaving the tips of the mountains clear and bright above an ocean of mist, and the atmosphere calm and steady, so as to admit of the observations for which the party had waited days and weeks to be taken in a few hours. At times the tents would be blown down by storms—or the camps would be whitened by a fall of hail or snow in July—or the camp taking two or three of the junior officers and a few men would start on a survey, necessitating a course by direct compass for the peaks that seemed most suitable, regardless of the nature of the intervening country. In these explorations they walked from thirty to forty miles a day, wading streams, crossing bogs, scaling cliffs, and sliding down into rocky valleys, Captain Colby ever the foremost; and when they came to a summit which his experience told him was suitable for a station, he would help with his own hand in handling up the great pile of stones by which it was to be marked, selecting the point points sometimes the resting-place at night would be a level bar where no other food was to be obtained than the national porridge; at others the weary explorers rested under a ducal roof—and on the west coast during the hot months they were tormented by the bites of the considerable mice. In one trip in 1819 the party walked 566 miles in twenty-two days. From this brief summary, a notion may be formed of the severe labour of the survey, apart from the scientific duty of observing with the instruments, which on all favourable occasions was continued from sunrise to sunset.

Captain Colby's activity and kindliness of disposition were not less apparent in camp than on the station-hunts. He would assist in erecting houses to "shelter the soldiers; and occasionally join with the men in a game of quoits, or in putting the stone or crowbar, and was a warm promoter of their feast at the close of each trigonometrical season." He was quite indifferent as to personal fame, but not so to make the name of his officers, and he at times permitted them to publish portions of the work in their own names rather as principals than assistants. His command over his temper was perfect; but he disliked to be disturbed by curious visitors when busy with observations for which he had long waited the opportunity. Once, while encamped at Sliove Donard in Ireland, the summit of Sea Fell in Cumberland became visible at the distance of 111 miles, and after many trials the instrument was brought to bear upon it. "Colby was on the point of successfully finishing his observation, which would have been a grand triumph, including the longest side of a triangle ever attempted, when an officer on entering the observatory accidentally struck his elbow, and threw the telescope off the object. A momentary effusion of his tears, but though he could not again succeed, and the object was therefore lost, he never afterwards alluded to the subject."
and parliamentary borough, and the seat of a Poor-Law Union, is distant 145 miles from Dublin. The population in 1851 was 3692, exclusive of 342 inmates of the Union workhouse. The Coleraine Canal, a day-deal, one member to the Imperial Parliament. The paling, lighting, &c., of the town are under the care of 21 town commissioners. Coleraine Poor-Law Union comprises 20 electoral divisions, with an area of 112,560 acres and a population of 12,161.

Coleraine is situated on both banks of the river Bann, at a distance of 4 miles from the sea. The principal part of the town is on the right bank, and consists of a central square called the Diamond, with several leading streets diverging from it. The town is supplied with good water from the Bann and a great arch of the Bann Bridge of 1799; and a sluice on the left bank of the river is a stone structure of three arches, 388 feet long and 32 feet in breadth, erected at a cost of 14,000L.

There is a great thoroughfare by this road between the northern parts of the counties of Antrim and Londonderry. The principal churches of Kilcowen and Coleraine stand in the respective divisions on either side of the river. There are also two Roman Catholic chapels and six meeting-houses of various denominations of Dissenters, an Endowed school, a National Model school, and a savings bank. The old court-house and town-hall stands in the centre of the Diamond. There is a new market-place with a commodious market-house. The town is lighted with gas. Vessels of 200 tons burden can anchor at the quay, but those of a larger tonnage have to work in the port. A trade of Coleraine is conducted from the harbour of Port Rush, 5 miles distant on the coast near the embouchure of the river. At Port Rush is a harbour formed by two piers of 600 feet and 650 feet in length, enclosing an area of 6 acres, in which the vessels of Coleraine lies at anchor.

The customs duties of the Coleraine district in 1856 amounted to 500L.; the excise duties amounted to 40,644L. The number and tonnage of vessels belonging to the port in 1856 were ten vessels of 293 tons aggregate burden. The entrances and clearances at the port in the coasting and cross-channel trade in 1856 were —Sailing vessels, inwards 120, tonnage 6080; outwards 44, tonnage 1350: steam vessels, inwards 21, tonnage 29,269; outwards 51, tonnage 11,353. In the coasting trade the vessels of 100 tons or upwards entered 1922 tons, and cleared 4 vessels of 1790 tons. The principal trade is the manufacture and bleaching of linens and the salmon-fishery. A fine description of linen manufactured here is known as 'Coleraine.' The fisheries (of salmon and eel) are the property of the Irish Society, who farm them out at an annual rent of 1200L. Upwards of 300 persons are employed as water-bailiffs in the protection of the salmon fishery from July 1st to November 30th.

The market days are Wednesday and Saturday, and the market is held on Monday, Wednesday, Friday, and Saturday. There are tanneries, bleach-grounds, paper-mills, and soap and candle works. Quarter sessions of the peace for the county of Londonderry are held in Coleraine. Thefrequency of death in Coleraine is very high. The female population of Coleraine in the Presbyterian Church arrangement is the seat of a Presbytery of the General Assembly, consisting of 16 congregations.

Coleraine is remarkable in early Irish history as the place in which Patrick founded a Christian bishop already located on his first progress through the northern parts of Ireland. A castle was built here in 1213 by Thomas Mac Uachtar, a Scottish adventurer. One of De Courcy's followers, called De Sendall, also erected a castle very soon after the conquest. The present town stands on the site selected by the Irish Society in 1613. It was at first fortified by an earthen wall with bastions. The place held out against the rebels in 1641. In 1653 the whole customs of the port amounted to only 152, 56. 4d. The neighboring districts are rich and well cultivated. A fall of the Bann over a ledge of rock of 12 feet high, at the Cutts, about a mile above the town, adds considerably to the picturesque interest of the environs.

COlERIDGE, Samuel Taylor, the eldest son of Samuel Taylor Coleridge, was born at Cledenon, near Bristol, Sept. 21st 1796. Two sonnets of his father are commemorative of his birth; and an exquisite poem of Wordsworth, 'To H. C. six years old,' describes the peculiarity of the child, 'a boy of wondrous face and of deep soul, associated with two poems of his father, 'Frost at Midnight,' and 'The Nightingale.' In 1800 S. T. Coleridge went to reside in the Cumberland Lake district; and there Hartley was reared; having a brother, Derwent, four years younger than himself, and a sister, Sara, six years younger. He was taken to London in 1807; and the various sights which he saw made an indelible impression on his mind, the effect being immediately apparent in the composition of those extraordinary and visionary works, which, in the year 1816, he printed with the title of "Slopes of Insolence." In 1826 he was placed, as also his brother Derwent, as day-scholars of the Rev. John Dawes, at Ambleside. As a school-boy he writes as a story-teller were unique; his imagination was absolute and romantic, whose recital lasted to the very last moment of his life. It has been said that what he wrote in one day—by the living voice of Coleridge, Southey, and Wordsworth, Lloyd, Wilson, and De Quincy.' In 1814 Hartley left school; and in 1816 went to Oxford, as a scholar of Merton College. His extraordinary powers as a converser, and his numerous invitations to wine-parties, were beyond a doubt—two—by the living voice of Coleridge, Southey, and Wordsworth, Lloyd, Wilson, and De Quincy. In 1814 Hartley left school; and in 1816 went to Oxford, as a scholar of Merton College. His extraordinary powers as a converser, and his numerous invitations to wine-parties, were signals to him in two ways—he used great freedom of remark upon 'all establishments,' and he acquired habits over which he had little subsequent power of control. He passed his examination for his degree in 1815, and soon afterwards obtained a fellowship at Oriel, with high distinction. An unhappy issue followed this honourable and independent position. "At the close of his probationary year, he was judged to have forfeited his Oriel fellowship, on the ground, mainly, of extravagance. His emoluments were 200L. a year; but we have no record that any friend stepped in to rescue one, so otherwise blameless, so sensitive, so unfit for any worldly struggle, from the permanent consequences of this early error. His brother, who records this painful epoch of his life, with his mortification, says, "He died, his family, his friends, his admirers, and his home, in poverty—" and the ruin of his fortunes served but to increase the weakness which had caused their overthrow." It is unnecessary for us to follow the biographer's explanation of some of the causes which led to this unhappy result—his morbid consciousness of his own singularity—his despondency at being unsuccessful in obtaining University prizes—his incapacity for the government of the pupils whom he received while at college—his impiance of control, and a belief that he was watched by those who knew his infirmity and mask their revulsion of manifestations of peculiar temperament. His qualification for future active exertion was irretrievably destroyed.

After leaving Oxford, Hartley Coleridge remained in London two years, occasionally writing in the 'London Magazine,' in which few of his minutes were published. In 1817 it is reported that he will be established at Ambleside to receive pupils. The scheme failed; and after a vain struggle of four or five years, the attempt to do what he was unqualified for was abandoned. From 1819 to 1823 he was a licentiate of the College, of the Lake district—idles, according to ordinary notions, but a diligent reader, a deep thinker, and a writer of exquisite verses, and of prose of even a rarer order of merit. From 1823 to 1831, he contributed to 'Blackwood's Magazine.' In 1834 he married Mrs. Wilson of Oxford, and he is now publisher at Leeds; for whom he produced a volume of 'Poems,' and those admirable biographies of the ' Worthies of Yorkshire and Lancashire,' which make us more than ever regret that one who wrote with such ease and vivacity, should have accomplished so little. In 1834 his father died, having, in a cordial to his will, expressed great solicitude to ensure for his son that "tranquillity indispensable to any continued and successful exertion of his literary talents," by providing for him, through the proper application of a bequest after the death of his mother, "the continued means of a home." Mrs. Coleridge died in 1845, and an annuity was then purchased on Hartley's life. Meanwhile, he lived with a humble family, first at Grasmere, and then at Rydal, a house which he had watched over by a kind spirit with whom the was an intimate, and beloved by all the inhabitants of the district. His illustrious friend Wordsworth was his close neighbour; and the house of the poet was always open to the child-like man of whose wayward career he had been almost preceding. In 1839 Hartley wrote a life of Massinger, prefixed to an edition of his works published by Mr. Moxon; and during the latter years of his life he wrote many short poems, which appear in the two volumes published by his brother, 'With Love, in Memory of Wordsworth.' He was a frequent visitor in the cottage which he had long occupied on the bank of Rydal Water, on the 6th of January 1849; and was buried in Grasmere churchyard. His grave is by the side of that of Wordsworth.
Coleridge was born at Keswick in 1801. Until her marriage she resided in the house of Robert Southey, who married her mother, and who had, as a profound influence over his intellect, the formation of her mental character must be largely ascribed, though she possessed in a remarkable measure the intellectual characteristics of her father. Her opening womanhood was spent at Keswick in the diligent culture and exercise of her native taste. She learned the Latin of Martin Dobrisheffer, a translation suggested by Southey, and the admirable execution of which he has commemorated in a stanza of his 'Tale of Paraguay.' In 1829 she married her cousin, Henry Nelson Coleridge. (Crollojans, ii. 64.

She now gave herself to her domestic duties, and her next literary production was prepared as a Latin lesson-book for children, 'Pretty Lessons for Good Children,' and speedily passed through several editions. On the death of her father in 1834, her husband, who was the poet's literary executor, set himself to the task of preparing such of the poet's uncompleted works as would serve best to exhibit him as a theologian, philosopher, poet, and critic, and Sara Coleridge helped him with her pen to this work. During her husband's life much of the collation and a considerable portion of the annotation fell to her share. After his death she did not hesitate to take upon herself the whole of the arduous labour. The 'Aids to Reflection,' 'Notes on Shakespeare,' 'Dramatists,' 'Addresses to the Academy,' and 'Times' were edited by her alone, and to some of them were prefixed elaborate discourses on the most weighty matters in theology, morals, and philosophy, which were discussed in a clear and vigorous style, with a closeness of reasoning and an amount of erudition quite remarkable in one of her sex. Sara Coleridge, like her father, had in no stinted measure the imaginative as well as the reasoning faculty. Her fairy tale, 'Phantasmion' wanted only the colouring of verse to have been equal to the best of the nursery tales, and more besides. It is a series of poems of the age; but in prose its often exquisite imagery and delicate shades of thought and feeling seemed to lack some clear and palpable intention; and it was regarded for the most part as vague, visionary, and obscure. Probably it will be on her commentaries upon her father's works—from which they are not likely to be by any future editor dissociated—that her fame will ultimately rest; but her rare acquirements and rarer gifts being thus expended on annotations, are now scarcely likely ever to meet with their due reward, and her name and memory have suffered accordingly. She died May 3rd, 1852. At her death she was engaged in preparing a new edition of her father's poems, which was completed and published by her brother, 'Poems of T. C. Coleridge and S. Coleridge,' 1832.

Coleshill [W. Wickershams.]

Collins, William, R.A., was born in Great Titchfield-street, London, September 18, 1757. His father, a native of Wicklow, was the author of various works which attracted some notice in their day; among others a poem on the slave trade, a novel entitled 'Memoirs of a Picture,' and a 'Life of George Morland.' The elder Collins was a picture-dealer as well as an author, though in no calling had he had much pecuniary success. Morland was a friend of his, and when his son began to exhibit a fondness for art and some skill in drawing, he readily obtained Morland's consent that the youth might stand beside him and watch him paint. William made tolerable progress in his pictorial studies. He entered in 1767 as a student at the Royal Academy at the same time as Etty, and in after life the two R.A.'s were fond of comparing their early drawings and subsequent progress. His earliest appearance as an exhibitor on the walls of the Royal Academy was in 1797, when he contributed two small 'Views on the Banks of the Thames,' and from that time with the exception of two years when he was away in Italy, he did not miss an exhibition for the remaining nine-and-thirty years of his life. His father's death in 1812 threw upon the young painter sacred duties, and these seem to have stimulated him to increased exertions. For some time he was employed to paint portraits as the readiest means of securing a moderate income, but his landscapes and rustic groups began to make their way, and he was soon enabled to follow the bent of his genius. Almost from the first he showed his fondness for painting groups of homely children engaged in some favourite diversion, or taking part in some juvenile trick; but it was not till the year following his election as associate of the Academy that his landscape work began to be noticed. As the path—the representation of coast scenery—which perhaps most surely led him to fame andfortune. From that time—indeed, for some three or four years previous—Collins never wanted patrons; his course from first to last was one of unbroken success.

As a painter of rustic life, or rather, perhaps, we ought to say of country children and homely country scenery, Collins had hardly a rival. He watched the habits and noted every movement of these groups of children. He could not be seen to fall on the bird's tail; exhibiting the fresh-found nest; buying the cherries—however the youngsters were represented the truth of the portraiture was at once apparent; and some quaint or novel incident was sure to be added, which marked more graphically than even the principal feature, the keenness of the painter's eye, and the skilfulness of his hand. In his coast scenes these characteristics were equally visible; and equally evident also was his happiness in the choice of his subject, in the attempt to surprise or excite. The painter knew exactly what was within the range of his powers. He saw his subject clearly; knew what he meant to accomplish, and seldom failed to accomplish it. Hence his pictures, apart altogether from those abounding in children, and therefore more or less arising from an excess of anxiety to render his work perfect. But, with increased command over his materials, he gradually acquired greater breadth and vigour; and though he always continued to finish his pictures with scrupulous care, he early recognised the truth of the axiom that more correctness of detail is not sufficient. And then with his technical and manipulative skill there was shown a close study of nature. The receding or advancing wave, the moist or parched sand, the teeming clouds, every phase and every feature of earth, water, and sky, and the varying effects of light and shade, are all represented. No wonder that in a country like this, where every one who can turn to the scenery of nature with never-tiring zest, such faithful transcripts of her commoner aspects, unadorned by the more ornamental picturesque, who, to city dwellers at least, always seem so genuine a part of the scenery, should have found abundant admirers and ready purchasers. In 1830 Mr. Collins visited Italy, and remained there nearly two years; diligently availing himself of every opportunity of examining the works of the great masters, but at the same time filling his sketch-book with transcripts of the more striking features of the natural scenery and careful studies of the monks and peasants, and, above all, of the children, in that land of lazy enjoyment and perennial beauty. On his return in 1839, he sent to the academy at the fruits of his journey two views in Naples: one with a group of young lazaroni playing the game of 'arroguglia;' the other with 'Poor Travellers' at the door of a Capuchin Convent;—also a view at Subiaco. They manifested an increase of artistic knowledge and power, and were greatly admired. The next year he appeared in quite a new branch of art, that of historical painting. With increasing years Mr. Collins had been increasingly in the depth and earnestness of his devotional feelings, and he not unnaturally felt a strong desire to represent in his own way the scenes on which his imagination loved to dwell. 'Our Saviour with the Doctors,' and 'Christ appearing on the Academy Bridge,' which was exhibited in 1840; 'The Two Disciples at Emmaus,' of 1841. They of course attracted attention, and supplied a topic of conversation in art circles, nor did they fall of purchasers; but it was felt to be a positive relief by the great body of the painter's admirers when, after a little coying with a certain scenery in one or two small pictures exhibited in 1842, he
The greater the philosophy their
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Collins was elected R.A. in 1890; in 1840 he was appointed librarian to the Academy, but resigned it on finding that its duties commanded but little of his attention. As the meetings of Collins are to be met with in most of the great private collections in this country. In the National Gallery the foreigner would look in vain for a specimen of this, one of the most thoroughly national of English painters. Fortunately, the Victoria and Albert Museum contains a certain time to-day: there may be seen an excellent example of his delineations of rustic enjoyment in 'Happy as a King,' painted in 1826; one of his pleasant coast-scenes, in 'The Shrimpers—Ever-Lasting,' purchased in 1822; and his 'Fisherman's Wedding,' painted in 1855. Mr. Collins married in 1852 the daughter of Mr. Geddes, A.R.A., and sister of Mr. Carpenter, the well-known portrait-painter; and by her had two sons.

COLINE. [Lycasana.]

COLUMBIA, a genus of Plants belonging to the natural order Rhamnaeceae. It has a spreading 5-cleft calyx; petals 5, obovate-convolute; stigmas 3. Fruit capsule, dehiscent, trilocular, girded at the base by the calyx. The seeds are furnished with a short stalk. The species are shrubs with alternate, quite entire, or crenulated leaves, netted with distinct hair-nerves, smooth but usually pubescent or rusty villous. The flowers are in axillary short crowded cymes, or in racemes or panicles.

C. formentum. Fermented Snake-wood, is a native of Guinea; the bitter bark of which tree is said to bring on violent fermentation in the liquors into which it is thrown. There are several other species described, natives of South America. There is a certain stoppage in the use of this plant, as none of them are of any known use, and are not worth cultivation except in general collections.

COLUMBITE. [Columbium.]

COLUMYON. [Devesirke.]

COLZA, [Brassica.]

COMBE, DR. ANDREW, was born in Edinburgh, October 27, 1797, the fifteenth child and seventh son of a family, which numbered seventeen in all. His father was a respected gentleman, and a man of superior mind and integrity; his mother also was a superior person. Educated in his boyhood and youth very much under the care of his elder brother George, the well-known phrenologist, he chose the medical profession; and, having studied at Edinburgh and Paris, and taken the degree of M.D., he began practice in Edinburgh in 1823. A pulmonary complaint under which he had laboured since 1819, and which obliged him to make frequent journeys into warmer climates, precipitated him from such an active career as a physician. In 1835 he was appointed Consulting Physician to the King of the Belgians. As early as 1818 he had, like his brother George, given his attention to phrenology and became a convert to it; and both of them while professors of this new science, continued to advocate its doctrines through the 'Physiological Journal.' He was also a distinguished writer on general scientific and medical subjects. The following is a list of his most important separate works:—Observations on Man.

COMTE, AUGUSTE, a French philosopher, whose peculiar system of views has been put forth by himself, and is generally known under the name of 'The Philosophy,' was born within a year or two of the close of the last century. His family was strongly Catholic and royalist. Educated at one of the French lycées, he gave very early proofs not only of a speculative turn of mind, but, as the son of a naval officer, of a love for sea voyages. He was educated in the College of St. Sulpice, and in 1828, having left school, entered the ship 'Bourbon,' Captain Dupuis, He had already extended his views to social questions, and became possessed with the doctrine that the time had come when all science and all philosophy must be treated from the social, as the supreme point of view. It was with a views and aim of this kind fermenting in his mind, that while yet a mere youth, he was involved within the powerful vortex of the Saint-Simonsian school, which, immediately after the restoration of 1815, began to figure in Paris. The genius of Saint-Simon, then between his fortieth and sixty year, drew around him, as by a kind of magnetic attraction, a number of ardent young men, whom he indoctrinated with his views, and almost all of whom—notwithstanding that few of them in mature years have adhered to the system—have occupied a conspicuous place in the history of modern thought. One of these was the youngest—the Benjamin, as he was called, of the Saint-Simonsian school. Saint-Simon had high hopes of him; and when, about 1825, the school took a more scientific turn, and espoused the exposition of the scientific basis of their system, it was on Comte that the preparation of the work devolved. The work entitled 'Système de Politique Positive' however only partially satisfied Saint-Simon, who said that while it "clearly understood the generalities of his system from the Aristotelian point of view," it overlooked "their religious and sentimental aspect." The truth is, Saint-Simon and Comte were beginning to part company. The discrepancy did not sharpen the distinction between the two. Comte always respected the work of Saint-Simon, including Saint-Simon— including Enfantin, Bazard, Rodrigues, and Augustin Thierry—who remained faithful to the views of their master, and set about forming an organisation for their farther propaganda. Comte succeeded in this organisation, Saint-Simon, and represented his temporary connection with that enthusiast as rather an interruption to his own true intellectual development than a furtherance of it; but in his main line, the system of views and the subsequent works and the cardinal speculations promulgated by Saint-Simon when alive, that, unless we can suppose that the pupil promoted the master to a greater extent than usually happens in such cases, it is impossible to acquit Comte of these high-flown ideas, which have been the subject of allusions to this part of his education. In 1826 M. Comte was seized with what he calls 'a cerebral crisis,' which for the time was believed to be irrecoverable insanity. He did recover however, and lived to promote the philosophy with
which his name is associated. Snapping himself by teaching mathematics—in which capacity he was professor at the Ecole Polytechnique, till differences with his colleagues and the accession of Louis Napoleon to the empire deprived him of his office, and reduced him to a state of indigence in which his chief support consisted of voluntary contributions from friends who in France and England he published during the last seven and twenty years a series of works, all devoted to the elucidation of his 'Positive Philosophy,' and in which even those who have no sympathy with that system in its abridged and popular form, can admire or even abhor it. He recognised great power of intellect, and an extraordinary fertility of generalisation on all subjects.

First, published at intervals in six large volumes, between 1830 and 1848, came out his greatest work, entitled 'Cours de Philosophie positive.' In this work he propounded and developed his main doctrine, which is, that the human mind has, by a natural law, passed through three successive stages in its thoughts upon all subjects; namely, the theological stage, in which phenomena are accounted for by the supposition of the agency of supernatural beings to produce them; the metaphysical stage, in which, while living beings are got rid of, certain abstract ideas, such as those involved in the words 'Nature,' 'Harmony,' and the like, take the place of thoughts as the productive causes of everything; and the positivist stage, in which all the different phenomena of the universe and the unseen spiritual agencies and abstractions, the mind grasps the notion of the universe in all its departments as proceeding according to certain laws or uniform sequences, to which the human mind is free to apply itself. This work was intended to apply this to the entire system of human knowledge. All that man knows, or can know, he says, consists of certain sciences which may be arranged in a hierarchical order as follows, according to the increasing specialty and complexity of the facts with which they respectively deal:—

1st. Mathematics, the most general and simple of all, which deals with the mere facts of number and magnitude; 2nd, Astronomy, which presupposes mathematics, but takes in the sciences of the celestial sphere, i.e., suns, planets, moons, comets, &c., as they are acted upon by the planets acting masses; 3rd, General Physics, which takes for granted the mathematical and astronomical laws, but concerns itself also with the motions and other mechanical phenomena of bodies on our earth; 4th, Chemistry, which, in like manner, presupposes all the foregoing, but investigates farther the phenomena of the molecular changes and constitution of bodies; 5th, Biology (subdivided into Vegetable and Animal), and involving Psychology as a department of Animal Biology connected with the general subject of the laws of growth and brain-function), undertaking the farther study of individual organised beings; and 6thly, Sociology or the Social Science, investigating, as the most complex phenomena of the universe, the intellectual and social activities of man, as their greatest object, under the name of positivism.

In 1848 M. Comte published a small mathematical work entitled 'Traité Elémentaire de Géometrie Analytique à deux dimensions,' followed not long afterwards by a popular treatise on astronomy, 'L'Univers.' The two books were admiringly received, and in 1844 he published as 'Discours sur l'Esprit Positif,' enforcing popularly the ideas of his larger work. Within the next few years, however, a second vital 'crisis' of philosophy was on the point of arising in the universities of the sentimental—work a certain change in his views. A virtuous affection, to which he makes frequent allusion in subsequent autobiographical passages in his prose, for a lady named Clotilde, whose death left him miserable, revealed to him, what Saint-Simon had long before hinted, the deficiency and meagreness of his philosophy on the sentimental and religious side. To make up this deficiency was the object of all his later activity. This he attempted to do, not by writing more positivist works, but by concentrating his thought and energy on the new problem of religion, with the fundamental doctrine of positivism; to accomplish which, seeing that positivism denies deity or invisible spirits of any kind apart from humanity, he makes humanity itself the object of the new worship. In 1848 he published a tract on the 'Religion positive,' in which the notion of the new religion, as the necessary appendix to his philosophy, was promulgated, and in 1849 he published a singular book of a more precise nature, entitled 'Culte Systematique de l'Humanite': Calendar Positivist, or System General de Commemoration publique, in which work he proposed a systematic worship by humanity of itself, as represented in its greatest men of all ages—twelve of whom he specified as worthy to preside over the twelve months of the year. This would be established on marriage ceremony and funeral rites when called upon by his disciples to do so. His disciples in this sense however were never numerous, and while publishing his last work, entitled '5th System of Positive Religion,' he supposed to have composed the last volume of his main work, 'Exposition de la Religion Universelle en ouvrage Entretiens Systematiques entre une Femme et un Pretre de l'Humanite,' which appeared in 1851 and the others have been issued since, he was not only in poor circumstances, but complained of the desertion of his pupils one after another, and expressed his sorrow that he saw no one all over the earth whom, before he died, he could ordain as his successor in the chair of the new philosophy and the pontificate of the new religion. M. Comte died Sept. 5, 1857.

Those who desire farther information respecting the life and work of this great man, will find it either in his own works above enumerated, or in two works published in this country presenting an abstract of his views—'Comte's Philosophy of the Sciences, being an Exposition of his Fifth System of Positivism,' by Miss Harriet Martineau, 'Positive Philosophy of Auguste Comte freely translated and condensed' (3 vols. 1853.) Comte's 'Philosophy of Mathematics,' extracted from his main work, has been translated in America by W. M. Gillespie; and his 'Popular Astronomy' also, if we mistake not, has found an English translator.

CONDAVIA, a genus of Plants belonging to the natural order Cichorieoideae. It has a campanulate calyx, 5-crenate or 6-toothed limb, deciduous; corolla filaments, with a somewhat curved tube, which is a little longer than the calyx, a dilated throat, and a 6-parted limb; stamens inserted above the middle of the tube or near the throat; anthers oblong, linear, bifid at the base, length of corolla; stigma ovate, cleft, 5-lobed; ovary sessile, middle of the cells. Seeds numerous, very small, wedge-shaped. The species are American shrubs, with 2-parted accuminate stipules and terminal many-flowered corymbs.

C. aequale is a native of the hills and ravines of the Peruvian Andes. It has ovate-oblong leaves, acuminate, cordate, sessile, pilate, coriaceous; coryzae large, bracteate, trichotomous; corolla purple externally, with the throat and filaments naked; teeth of the calyx broad, short, and broad with the tube; the tube is said to use this plant for adulterating samples of Cichoreum. Its bark is only slightly bitter, and may be easily recognised by its being white inside, rather bitter, and viscid.

C. alpino-americanum, a native of South America, and is used occasionally.

CONDEER, JOSIAH, was born in London on the 17th of
September, 1789. He was the son of a bookseller, and very early displayed a taste for literature. His first attempts were given to the world in the 'Athenaeum,' a monthly magazine then edited by W. Aikin, and in 1810, in connection with a few friends, a very small affair was published under the title of 'The Associate Minstrel.' In 1814, being at the time a publisher and bookseller in St. Paul's Churchyard, he purchased the 'Eclectic Review,' of which he continued to be editor for some time before he deserted the bookselling business in 1819. Under his management the 'Eclectic Review' received the assistance of many eminent men among the non-conformists, such as Robert Hall, John Foster, Dr. Chalmers, Dr. Vaughan, and others. During this period, his industry was taxed by the prodigious amount of books published under his superintendence. In 1824 also appeared 'The Star in the East,' a poem; and in 1834 'A Dictionary of Geography,' and a new translation of the 'Epistle to the Hebrews,' with Notes. In 1836 he edited 'The Congregational Hymn-Book,' issued under the sanction of the Congregational Union; and in 1837 he published 'The Choir and Oratory: Sacred Poems,' to which Mrs. Conder was a contributor. He was the author of many other works, but we have mentioned the principal.

Mr. Conder's reputation having become established among the Dissenters, he was requested in 1832 to undertake the editorship of 'The Patriot,' a newspaper recently established in the dissenting interest. From this time he took a more active part in public proceedings the Dissenters, attending their meetings, and affording the assistance of his counsels. The 'Patriot,' under Mr. Conder's management, became the organ of what may be termed in politics the Whig section of the Dissenters, as opposed to the Radical section under Dr. superintendent. For twenty-three years Mr. Conder fulfilled the duties of his office with exemplary care, industry, and liberality; producing also occasionally works of importance, such as 'Analytical and Comparative View of all the systems of Natural History, with Prophets, &c.,' and several pamphlets on stirring topics of the day.

Mr. Conder married in 1815 Joan Elizabeth, the daughter of Mr. Thomas of Southgate, by whom he left four sons and a daughter. After a short illness, he died on Dec. 27, 1855.

COUDE, JAMES FENIMORE, was born at Burlington, towards the tip; prebrachial and discal areole long, the latter closed near the posterior margin by a transverse vein; anal areole long, distinct, complete. Abdomen arched, rather long, with six segments more or less slender towards the base, outline of the base, rather stout; tubic very slightly curved, compressed and dilated at the tips, in some cases with a transverse suture; dorsal rather broad, opaque and onychia distinct.

CoUIN, a genus of plants belonging to the natural order Amentiferae. The species are small trees with imparipinnate leaves; islets alternate, unequal at the base, or oblique.

COOKSTOWN. [TYRONE.] COOPER, JAMES FENIMORE, was born at Burlington,
New Jersey, United States, on the 16th of September, 1789. His father was of a Buckinghamshire family, which emigrated to America about twenty years before; and his mother was a future novelist. When James was about two years old his father removed to the banks of the picturesque Otsego Lake, Western New York, and there founded the village of Cooperstown; and somewhat later he was elected a judge of the state of New York. He was admitted to the rudimentary branches of learning, he transferred himself to the care of the Rev. J. Ellison, an episcopal clergyman at Albany, by whom he was prepared for college. He remained at Yale college from 1802 to 1806, when, having discharged his military duty as he served at sea for six years, and his conduct won the approbation of his superiors, and the esteem of his fellow-officers. It was here he acquired that familiarity with a maritime life, and knowledge of the ports and phenomena of the ocean, which lend such a charm to his naval stories. On retiring from the service he in 1811 married Miss Delancy, a sister of Bishop Delancy of New York, and took up his abode in the family village of Cooperstown.

His next few years were spent in private life. It was not till 1821 that Mr. Cooper appeared as an author. His first work was a novel, "Precaution," which professed to be a story of English life. It met with no success, but the author, like most men of the time, proceeded to fore the public again, with "The Spy—a tale of the Neutral Ground." A thoroughly original and genuine American novel caught the American ear, much as "Waverley" had caught the Scottish. Its success was immediate and unbounded. In England its vivid picturesque characters and rapid movement gave it an additional charm of novelty, and Cooper at once took rank with the leading novelists of the day. The "Pioneers" followed in 1823, and confirmed the reputation of its author. A year later appeared "The Pilot—a Tale of the Sea." These were the types of a long series of novels which during many years flowed from Cooper's prolific pen. He had in them brought before his readers the mighty forests and wide prairies,—the backwoods of America, with their original occupants, the hunters and trappers, men who had never seen a city, and settlers, who were rapidly supplanting them; and the sea with its daring American privateers; and again and again he was to reproduce these in more or less varied forms. The strength of his narrative, his power in delineating character, his command of the passions, keenness of observation, and descriptive skill were acknowledged without stint, and America was admitted to have produced a great original novelist.

Like Scott, thought the tide of success was to be taken at the fall; and he published novel after novel with a rapidity rivalling that of the author of "Waverley." For a time his imagination and store of knowledge appeared to sustain without diminution the heavy drain. He was never hapless; he was a prolific and enterprising writer; his mind was like the reader along with more rapidity and interest, than in the "Prairie" and the "Last of the Mohicans," which appeared after "Lionel Lincoln" and one or two others, in 1836; in the "Red Rover" and the "Water Witch," and the "Wept of the Whig-Whisp," which followed in succeeding years. But in these and a few others he exhausted his genius, and novels like " Ned Myers," the "Sea Lions," "Merced p Cattails," "The Headman of Berne," served only to call into clearer notice the weak points of their author; yet the "Deerslayer" and one or two other of his later stories had so much of beauty and strength, that there had been no intervening failures, there would have been little reason to fancy that the hand of the great American novelist had lost its skill.

In 1829 Mr. Cooper visited Europe, where he remained for about ten years, his longest sojourns being made in London and Paris. The fruits of his European travel were the novels of "The Headman," "The Bravo," "Heidenmaier," and "Mercy p Cattails," which followed immediately after "Homeward Bound," and "Home as Found," which, with the "Introductory Letter to his Countrymen," stirred up some strong feeling. Nor was he, as we have already intimated, idle in the United States during the interval of his return to America, although in several of them he returned to his old American forests and sea haunts. But he wandered also often into the regions of home and foreign politics, not even keeping clear of controversy in his novels; and his very inaptitude for reasoning rendered him the more dogmatic in maintaining his own views and irascible under contradiction or dissent.

Some of his home critics he prosecuted for libel; his foreign opponents he denounced with unbowed wrath. However, he soon obtained his own, and was rewarded at home and abroad with a return of the old admiration and esteem; so that his death, which occurred at Cooperstown on the 14th of September, 1851, caused a general expression of sorrow throughout the country. He was buried in this country, where he had hardly fewer readers and admirers than in his own land.

Besides the novels mentioned above, Mr. Cooper wrote "The Pathfinder," "The Monikins," "The Two Admirals," "A Romance of Waverley," "Autobiography of a Pocket Handkerchief," "Castaways," "The Chainbearer," "The Crater," "Oak Openings," "Jack Tier," "The Sea Lions," and we believe one or two others. He also wrote "History of the United States Navy," which appeared in 1833; and a "History of the American Naval Officers," "Gleanings in Europe," "Sketches of Switzerland," "Notions of the Americans by a Travelling Bachelor," and "The Way of the Hour." Most European languages have translations of some of Cooper's novels, and it is stated that one or two of his Oriental tongues possess a version of at least one of his stories. Most of the earlier novels and several of the later have been rendered into German; and in French there is a translation by Delaunay, besides another in 6 vols. by Meens. Laroche and de Montémond.

COOT (Pulicaria).—COOTEHILL, county of Cavan, Ireland, a post-town and the seat of a Poor-Law Union, in the parish of Drumglen, about 10 miles S.E. of Enniskillen, and a prizetown founded in 1791. It is 7° 2’ W., 73 miles N.N.W. from Dublin. The population in 1851 was 2106, besides 1101 in the Union workhouse and other public institutions. Cootehill Poor-Law Union comprises 19 electoral districts with an area of 105,845, and a population of 44,333.

Cootehill lies on the road from Kingscourt to Clones, and has four principal streets, which are wide and substantially built. It contains a neat church, besides chapels for Roman Catholic and Protestant denominations. In the vicinity are a number of towns, and a large market for agricultural produce. The town stands at the western extremity of a series of lakes which are navigable for the greater part of the distance (7 miles) hence to Ballybay. The neighbours are well cultivated, and adorned with numerous demesnes and mansions. Quarter sessions for the county are held at Cootehill. There are here a bridewell, a dispensary, and a station of the constabulary force. A fair is held the first Friday in August.

COPLESTON, REV. EDWARD, D.D., was born February 2, 1776, at the rectory-house, Offwell, Devonshire. His father, the Rev. John Bradford Copleston, was the rector of that parish, and he educated at his own residence a limited number of poor children. In 1791—when he was 15 years old—he entered Jesus College, and in 1791 Edward Copleston was elected to a scholarship at Corpus Christi, Oxford; in 1793 he obtained the Chancellor's prize for a Latin poem; and in 1795 he was elected a Fellow of Oriel College. He obtained the Chancellor's prize for an English essay on 'Agriculture,' in 1796, and in 1797 was appointed college-tutor, though he had not then taken his degree of M.A. In 1803 he was elected Professor of Poetry to the university, in which office he succeeded Dr. Hardie. He published in 1813 the substance of the lecures which he delivered, under the title of 'Principles of Academical Education,' a work which gained him a high reputation for pure and elegant Latin composition combined with extensive poetical information. Some severe attacks on the University of Oxford having been made in the 'Edinburgh Review,' Mr. Copleston published in 1816 a 'Reply to the Calumnies of the Edinburgh Review against Oxford,' which was followed by another 'Reply' in the same year, and by a third in 1811. These replies were greatly esteemed by the university, and respectfully treated by the authors of the 'Calumnies.' Mr. Copleston was elected Provost of Oriel College, and soon afterwards the degree of D.D. was conferred upon him by diploma, the instrument setting forth that this distinction resulted from a grant made by one of the many public institutions which had recently conferred upon the University. Dr. Copleston is chiefly remembered as a divine by his work on 'Predestination,' which consists, for the most part, of three sermons preached at St. Mary's church, Oxford, 'An Enquiry into the Doctrines of Necessity and Predestination, with Notes,' and as the Appendix to the 17th Article of the Church of England.
Between the years 1811 and 1812 he contributed many articles to the 'Quarterly Review.' In 1816 Dr. Copleston was appointed to the deanery of Chester, and in 1827 he succeeded Dr. Summer in the bishopric of Dandoff and deanery of St. Paul's, London. He also held the honorary appointment of professor of ancient history to the Royal Academy of Arts, being a fellow of the Society of Antiquaries. After he became a bishop his time was chiefly occupied in the performance of the duties of his diocese. Some of his sermons, charges, and speeches in the House of Lords, were published at the time when made. His principal work as a bishop was 'Memoirs of E. Copleston, Bishop of Landaff, with Selections from his Diary and Correspondence,' 8vo, by William James Copleston, 1861, &c.

**COPROLITES** (Fr. coprolite), the fossilised excrement of reptiles, fish, and other animals, found in various strata of the earth. Dr. Buckland in his 'Bridge-water Treatise' first drew attention to the probable nature of these beds several of which had been previously known under the name of Bezoar Stones. These fossils were first detected in the Lias at Lyme Regis and in other localities, and their true nature inferred from the fact of their identity with similar masses found actually within the body of many species of reptiles and fishes. They are composed of scales of fishes, and occasionally teeth, and fragments of bone, belonging to species of fishes and reptiles which have been swallowed by the animal as food, and have passed undisgested through its stomach. They often occur in large numbers. These bones have been formed by the nodule-bearing excrement of some of the larger forms of recent fish, and have been accepted by comparative anatomists as indications of the nature of the intestinal tube in the extinct forms of Bezoar Stones.

Professor Liebig says in his 'Letters on Chemistry,' "in the autumn of 1842 Dr. Buckland pointed out to me a bed of Coprolites in the neighbourhood of Clifton, from half to one foot thick, inclosed in a limestone formation, extending as far as the eye could reach. This is an interesting example of copyright in the mineral kingdom of the Severn. The limestone marl of Lyme Regis consists for the most part of one fourth part of fossil excrements and bones. The same are abounding in the Lias of Batheaston, and Broadway Hill, near Evesham. Dr. Buckland mentions them in the midst of many places of a fourth part of Coprolites."

Coprolites, when chemically examined, are found to contain a large proportion of phosphate of lime. Liebig states that some he examined from Clifton contained about 16 per cent. of ash, and other specimens he examined afforded a much larger per centage. The occurrence of phosphate of lime in these substances has led to their use as manures, and large quantities are annually collected in this country. When prepared, it was found they were converted into the action of sulphuric acid, by which the phosphate is converted into a super-phosphate of lime.

Not only have the beds of the Lias afforded deposits of phosphate of lime which have received the name of Coprolites, but they have also been found in the Greensand, in the Wealden Formation, and in the Red Crag. In the latter formation it may be altogether doubted as to whether the phosphate of lime there found in the form of dark-brown or blackish smooth nodules, can be appropriately called Coprolites. These beads commonly occur in beds of the Red Crag of Suffolk, where, in the neighborhood of Ipswich and Woodbridge, and on the sea-coast of Felixstow and Bawdsey, it is worked to a considerable extent. In addition to the above various forms of Coprolites, there are of very various forms of Cataple, all of which contain large quantities of phosphate of lime, and are collected under the name of Coprolites. It is still a question of interest as to how the nodules not having an organic basis have been formed. It has been supposed they occur as deposits of lime derived from the destruction of organised beings, but it is very evident that phosphate of lime must have existed in some form or another before the creation of either vegetable or animal beings. The increase also of the number of species of species of fishes and animals demands that there should be some constant supply of this substance from the mineral kingdom. Whatever may be the result of further inquiry on this point, there can be little doubt of the improbity of calling all deposits of phosphate of lime Coprolites. A better general name and which is not exposed to the objection of a false theory would be Phosphatia. (Proc. Geol. Soc. London, 1847.)

**COPYHOlD.** The statute 4 & 5 Vict. c. 35, has been amended by the 6 & 7 Vict. c. 33; 7 & 8 Vict. c. 55; and 15 & 16 Vict. c. 51. The result of these statutes may be shortly stated thus. The lord may now be compelled by the tenant, under the penalty by a landlord, to purchase the beneficial use of his land at the first surrender and admittance which takes place, and on terms, if the parties cannot agree, to be fixed by the Copyhold Commissioners.

**COPYRIGHT.** In order to take advantage of any disposition which may be manifested by foreign nations to recognise British copyrights, powers have been conferred on the Sovereign, by the stat. 7 & 8 Vict. c. 12, to grant, by Order in Council, privileges of copyright in this country to the authors of books, prints, and works of art, first published abroad. The authorship of many new works is not of a manner to be granted to the authors of dramatic or musical compositions. Such Order in Council cannot, however, be made until due protection for British copyright has been secured to the subject of the country to the subjects of which the privileges of copyright in this country is conceded.

Under this Act, conventions for the mutual protection of copyrights have been entered into with the following countries: the United States of America and its Territories in 1848 and 1871; Prussia and Hanover, 1847; France, 1851; Anhalt-Bernburg, 1853; Hamburg, 1858; Belgium, 1858; Spain, 1857; and their stipulations have been embodied in the British statute 15 & 16 Vict. c. 12. Authorised translations of foreign books and dramatic pieces are by this statute protected for a term not exceeding five years from publication.

The Designs Act, 1850, confers rights to be provisionally registered for one year, and confers powers on the Board of Trade to extend the copyright for a term of three years. The same statute provides for the registration and protection against piracy of sculpture, models, copies, and casts. The British Design Acts have been combined with the foreign copyright Acts for the protection of work produced abroad under the statute 15 & 16 Vict. c. 12, to printe by lithography, or other process of indefinite multiplication. ['Blackstone's Commentaries,' Mr. Kerr's ed., vol. ii. pp. 416-417].

**CORACIAS.** [Roler.]

**CORALLINACEAE.** A family of Marine Plants belonging to the order Alga. According to Harvey's definition it includes the Corallinae and Spongistes of Kitting, and the Corallinidae and Nulliporidae of Dr. Johnston.

The forms referred to this family have been alternately regarded as Algal or Animal. While their structure was imperfectly understood they were regarded with many of the zoophytes (Polyphyllus and Polycon) and sponges as seaweeds. When the animal nature of these beings was established, it was found they were essentially marine plants, belonging to the animal kingdom. Recent researches have however demonstrated the truly vegetable nature of this family both in their general structure and mode of reproduction. The following is Dr. Harvey's diagnosis in his 'Manual of the British Marine Algae':—"Rigid, articulated, or crustaceous, mostly calcareous sea-weeds, purple when recent, fading on exposure to milk-white. Composed of closely-packed elongated cells or filaments, in which carbonate of lime is deposited in an organised form. Tetrasporae tufted, contained in involute or spherical conceptacles. Ceramidium furnished with a terminal pore.

The following general remarks on this family are taken from Dr. Harvey's work:—The root, where this organ is well developed, is an expanded connutaneous disc, often widely spreading. The frond almost always calcareous, efferveencing strongly when thrown into acids, rarely destitute of lime, very variable in aspect and habit. The lowest forms of the order are simple incrustations, spreading like the crustaceous lichens over the surface of rocks, or the fronds of the larger algae. In the smaller of these the crust is a mere film, as thin as paper, generally circular, and extending by means of small additions to the circumference, so that the frond becomes masked as it advances with concentric circles. In the larger the crust is thick and stony, rising by concentric laminae and sinuences and sinking into depressions. Still further advance manifests itself by the crust assuming a branched habit: at first papillate rise from the surface; these thickened, and widen, and lengthen, and throw out branches, till the shrubby front, of stony hardness, but extremely brittle, is..."
formed. All these changes in character take place within the limits of a single species, 

Corallina. Neary related to this (and by many botanists considered identical) is Muto-

phora, a genus in which the frond is expanded into leafy lobes, usually fan-shaped, sessile, or stalked, but not adnate to rocks; of a flexible substance, containing a smaller portion of carbonate of lime than the foregoing, and these have the habit of Padina, but differ from that genus in being of a red color. They are the most perfectly organised of the leafy or frondose Corallines (Millepora). The articulated or 

branchless Corallina, either smooth or red, consists, the branches formed of strings of calcareous articulations, truncafed at the upper extremity and rounded at the lower, each articulation connected with that above and below it by a flexible joint composed of cellular tissue, destitute of car-

cbonate of lime. It is difficult to say in which of these is the greater number they are heart-shaped or wedge-shaped, with the upper angles frequently prolonged with horns. 

The fructification consists of hollow external or immersed conceptacles containing a tuft of oblong spores, divided at maturity into four units. The whole 

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4. **Hidenbrandia.** — The frond cartilagino-membranaceous (not stony), crustaceous, suborbicular, adhering by its lower surface; composed of very slender closely-packed vertical filaments; conceptacles immersed in the frond, orbicular, depressed, pierced by a hole, and containing tetratacospores and paraphyses at the base of the cavity.

**H. rubra** is found on smooth stones and pebbles between tide-marks and in deep water. It is very common, and forms a thin membranaceous crust, at first covered with mosses, and spreading concentrically, at last irregular in form, following the sinuosities of the body to which it may be attached. Viewed under the microscope, a small portion shows minute cells lying in a clear jelly. When in fruit, the structure is pierced by a hole which communicates with a chamber in which the spores lie. The colour is variable; now a bright, now a dull red.

Sub-order 3. (1) **Lithocystis.**

**Lithocystis.**—Plant calcareous, consisting of a single plane of cells, which are disposed in radiating dichotomous series, forming an appressed flabelliform frond. Named from a stone in the hamlet, because the cells have stony costs.

5. **L. Allmannii** is parasitical on *Chrysemnia clavellata* from an oyster-bed at Malahide, Dublin, by Professor Allmann. It forms minute dot-like patches of a whitish colour on the frond of the *Chrysemnia.* It is one of several fan-shaped fronds composed of quadrate cells disposed in dichotomous series. The plant is brittle, colourless, and effervescent in acid.

(Harvey, *British Algae.*); (Borley, *Ecological Mem.)

**CORBULA,** a genus of Marine *Mollusca,* belonging to the *Lamellibranchiata.* The shell is suborbicular or oval, tumid or depressed, very inequilateral, slightly inequilateral, rounded anteriorly, more or less truncated posteriorly, black prominent; surface of the valves more or less furrowed or transversely striated, covered with epidermis. Hinge composed of a recurved primary tooth in one or both valves, with corresponding sockets and ligamental pit beside it. Ligament small, triangular or kidney-shaped; muscular impressions slightly marked, united by a pallial o or very slight sinus. The animal is short, with very short united siphonal tubes. Orifices fimbriated. Mouth closed, except in front, where there is an opening for a hony narrow foot thick of considerable dimensions. Anal siphon with a conspicuous tubular membrane. Labial tentacles slender.

This genus was once abundant in the European seas, especially during the early part of the Tertiary epoch. Only a few species now exist. It has more species in the tropical seas of the present day.

C. nucleus is one of the most common species in the seas around the British Islands. Whilst very frequently found in the dredges, it is seldom washed on shore or found in shallow water. It is about half an inch in length and about one-fourth in breadth.

This genus belongs to De Blanchville's family Psilidae, which comprises *Solen, Panopea, Mya,* and other allied species. *[Psilidae.]*

CORBY. [London.]**

**CORCHORUS,** a genus of Plants belonging to the natural order *Tiliaceae.* The leaves of *C. olitorius* are used in Egypt as a pot-herb. Fishing-lines and nets, rice hags, and a coarse kind of linen called tap, are made in India of the fibres of *C. indicum.*

**CORDIA,** a genus of Plants belonging to the natural order *Cordiaceae.* It has a tubular calyx, 4-5 toothed. Corolla funnel-shaped or campanulate, with a flat 5-6-cleft limb, and a hairy or naked throat. Stamens 6, short, inserted in the throat of the corolla. Style protruding, bifid, with 4 stigmas. Ovary 3-4 celled. Drupe containing 1 stone with 1 or 3 cells, two of which are usually abortive.

**C. sativus** is a native of Hindostan. It has numerous species and varieties; the seeds bear edible and rubbery branches; the young shoots angular and smooth. The general height of trees ten or twelve years old about 20 feet. Leaves alternate, petiolate, round, coriaceous, and ovate, often slightly reaped; 3-nerved; of a hard texture, bright green above and pale underneath; from 3 to 7 or even 8 inches long, and rather less in breadth. Petioles nearly round and smooth. Panicles short, terminal, and lateral, roundish; the branches alternate, diverging, and one or more frequently dichotomous. Flowers numerous, small, white. Bracts minute, villous. Calyx villous, campanulate, leathery; mouth unequally toothed. Corolla short, campanulate. Segments 6, linear oblong; filaments as long as the segments of the corolla, and inserted immediately under their bases. Anthers oblong, fleshy, 4-cleft, with one ovule in each to the upper end of the axis. Style short. Stigma 4-cleft; segments long, rugose, and recurved. Drupe oblate-spheroidal, about an inch or an inch and a quarter in diameter; smooth when ripe, straw-coloured, and covered with a fleshy sarcotesta. Plums, Sebastos, or Sepiastr, two sorts of Indian fruit, have been employed as pectoral medicines, for which their mucilaginous qualities, combined with some salativity, have recommendation; they are believed to have been the *Peraeae* of Dioscorides. Linnaeus gives the name of Sebasten to an American species of this genus which is not known in medicine.

**C. Myxa** is a native of many parts of India, Persia, Arabia, and Egypt. It is of a larger size than *C. olitorius,* 4-5 feet high, and as thick or thicker than a man's body. The bark gray, cracked in various directions. Branches numerous, spreading, and bent in every possible direction, forming a dense shady head. The flowers are numerous, white, small; a very large proportion of them are sterile, and they always want the style. The drupe is glabrous, smooth, the size of a cherry, sitting in the enlarged calyx; when ripe, yellow; the pulp is almost transparent, very tough, and viscid. The fruit is of good quality, and the taste of the kernels like that of the filberts. It is the true Sebasten of the European Materia Medica. The fruits, according to Roxburgh, are not used in the Cireacis medicinally, but when ripe are eaten by the natives, and also most greenly in the tropical and sorts of birds, being of a sweetish taste. The wood is soft, and of little use except for fuel. It is reckoned one of the best kinds for kindling fire by friction, and is thought to have furnished the wood from which the Egyptians constructed their mummies. The wood is said or more by Dr. Royle to be accounted a mild tonic.

**C. Gresacanthus** is a native of the West Indies in woods, and of Mexico, near Acapulco. It has ovate oblong leaves, acute, quite entire, glabrous; racemes terminal, aggregate; flowers numerous; calyx ovate acute, glabrous; corolla 5-cleft; throat villous; stamina of the length of the corolla. This is esteemed one of the best timber-trees in Jamaica, of which it is a native. The wood is of a dark brown colour, and gently striated: it is tough and elastic, of a fine grain, and very worked. It is called Spanish Elm or Prince Wood by the English, and Bois de Chypre by the French.

**C. Rumphi** has brown wood beautifully veined with black, and small circular patches of the same.

There are above 100 species of this genus.

**CORDOVA,** the most important next to Buenos Ayres of the provinces of the Argentine Confederation, South America, comprehends the Sierra de Cordova and the surrounding country. It is divided into the N.E., N., and N.W. by the Grand Salina from Santiago, Catamarca, and Riojo, and on the W. by a travesía, or desert country overgrown with stunted prickly trees from San Juan. A sterile and thinly inhabited country lies on the south-east between the east and San Luis. On the south it extends to the Pampas of Buenos Ayres. The low sterile tract in which the rivers Segundo and Primero are lost, and the Lagunas Salados de los Porongos is situated, separates it from the country of Santa Fé. The province is variously estimated at from 65,000 to 90,000. Cordova is much more fertile than the countries which surround it. Numerous rivers descend from the Sierra de Cordova, but all are lost in the desert, except the Rio Tercero, which, during part of the year, finds its way to the Cercadilla, which falls into the Paraná near Santo Espiritu below Santa Fé. This river would be navigable for six or eight months in the year, but for two small rapids, which however might probably be removed. The country is divided into districts, and those which extend along their sides, have a fertile soil, and maize and fruits are raised there in abundance, but the plains, as well as the declivities of the mountains, are only fit for pasture. Cattle and sheep constitute the principal wealth of the republic. Hides and furs of llamas are exported to Buenos Ayres. At present the produce of this province is all sent to Buenos Ayres; but when steam navigation is established on the Paraná, the commercial intercourse will probably be largely carried on through Santa Fé. The province is ruled by a governor, assisted by a junta.
Cordoba, the capital, is situated in 31° 36' S. lat.; it is built on the banks of the Rio Primero, in a narrow valley considerably depressed below the general surface of the country. This situation is in many respects disadvantageous, but it is thus sheltered from the north wind, which blowing alternately on the higher grounds produces sudden changes in the atmosphere which are injurious to health. The town contains about 15,000 inhabitants. The streets are narrow, untidy, and the houses are built of brick, and better than in other towns in the interior; most of them have balconies. In the centre of the town is a spacious square, on one side of which is a neat town-hall, and on the other a fine cathedral. There are also ten other well-built churches and chieftly Moorish in style; and one modern church erected in a very costly manner. The University erected by the Jesuits is on a scale of great magnitude, covering an area of four acres. In former times it was famous, being the principal college (the Colegio Maximo) of the order in this part of the world. It contained also a very important library, which on the expulsion of the Jesuits was sent to Buenos Ayres. The university is still maintained, but is now hardly better than a provincial college. The city is intersected by two great and two smaller canals, and Franciscans. A fine public promenade occupies a considerable space; it includes a square sheet of water of about four acres supplied by a running stream, which is surrounded by walks, well shaded by trees, and has in the centre a large reservoir formed by the Segundo Guadalquivir. The town is in summer a shallow stream, but in winter becomes a deep and wide river; to preserve the town from the effects of its overflow a strong wall has been built, yet destructive floods still sometimes occur. Cordova was formerly the depot of the European merchandise intended to be sent to Peru, but this branch of commerce no longer exists. There is a mint in the town. The only manufacture is that of leather. There are no foreigners in the town, and scarcely any in the province. Religious toleration is unknown. AlicoGracia, a neat town near the base of the Sierra de Cordova, contains nearly 3000 inhabitants.

CORN CRAKE (Gammarirue). [RAILIID.] CORNEL TREE (Cornus.)

CORPUS CHRISTI, a genus of Animals belonging to the class Crustacea and the family Gammaridae. With the whole of the family it is remarkable for the length of its antennae. It has no claws. One of the species, C. tectile, is found in the English rivers. It was called C. tectilis by the old naturalists, and is well known on the coast of La Rochelle for its habit of burrowing in the sand. They live principally upon the annelids which inhabit the sand, and are remarkable for their great agility, the speed of their run being equalled only by that of the greyhounds. It is a valuable fish, and is frequently used as such. Another species, C. haematocheilus, is frequently caught in the east coast of the United States, and is used both for food and sport. It is remarkable for its great size, the length of the body and the number of its fins, being equalled only by the Porphyra.

Corporations. There has been a great increase of late years of bodies having many of the characteristics and privileges of Corporations, to which the remarks under Corporation in Penny Cyclopaedia, v. viii. p. 46, do not apply. In effect there are now three distinct species of Corporations—1. Those which may be described as existing at common law, having been generally created by Royal Charter. 2. Municipal Corporations. 3. Trading Corporations.

Under the first head may however be classed those Municipal Corporations by which the Municipal Corporations Reform Act does not apply, the universities and the colleges therein, and most of the old chartered bodies, such as the College of Physicians, the Companies of London and other cities, and many more of our ancient charitable institutions. These are governed by the provisions of their Charters and Bye-Laws, adherence thereto being enforced when necessary by the Queen's Bench or in Chancery.

The second class of the Municipal Corporations have been treated of in the chapter on Boroughs.

The third class, or Trading Corporations, comprises Railway and Canal Companies, and similar bodies, created by Act of Parliament, having commercial profit for their object. Thus Joint-Stock Companies for the purpose of banking or insurance are scattered abroad, by district, and, as each may be constituted according to the provisions of these Acts, and Other trading companies may constitute themselves into Corporations by registration in prescribed form, and on complying with certain requirements.

The distinctive ranks of these different kinds of Corporations are noted under the appropriate heads. [Joint-Stock Companies, § 2.]

CORREA, a genus of Plants belonging to the natural order of the Rutaceas, of which one of the species, C. albida, is used by the settlers in Australia as a substitute for tea.

CORRENTES, one of the Riverine provinces of the Argentine Confederation, South America, comprehends the territories which have been ceded to Paraguay, the provinces of Parana and Uruguay; the southern portion of the peninsula being occupied by the province ofEntre Rios. The population is about 30,000.

The southern and eastern parts of the province are somewhat mountainous, and by far the greater part is low. About half the surface is covered with timber-trees, much of the wood being available for house and ship-building. Some thousand square miles are covered with palm-trees, which are used for a great number of purposes. In the northern part of the province is the Laguna Vizcachas, which is in fact a vast marsh overflowed during the periodical risings of the Parana. It feeds all or nearly all the rivers which rise in the interior of the province and fall into the Parana except the one into or the Dominical and Matanzas rivers. In the latter the grass is generally sandy, but produces excellent crops. Cotton, tobacco, rice, sugar, indigo, and other tropical productions flourish, yet little attention is given to them, partly owing to the scantiness of the population and partly to the want of foreign markets. Besides the articles mentioned above, maize and barley, arrow-root, melons, sweet potatoes, and various tropical fruits are raised. The sugar-cane is at present only grown in order to extract molasses for distilling; the sugar consumed in the province is imported. The climate is healthy; the crops suffer at times from visitations of enormous swarms of sute and locusts, which entirely devastate the districts in which they appear. The chief employments of the inhabitants consist in the renting of cattle, the raising of sugar-cane and other crops, and in the cultivation of good pasture land. Sheep however do not thrive very well. Large numbers of hides are exported. Mechanical pursuits are entirely neglected. The province is well adapted for commerce, there being on the Parana four wharfs which serve as good ports, and three on the Uruguay. The opening of these rivers will doubtless prove of great benefit to Corrientes, but the traffic can only be fairly developed when the rivers are navigated by steam-vessels. The inhabitants are for the most part a mixed race of Indians and Spaniards, although the latter form by far the greater portion of the population. There is a great amount of trade among the different tribes of Indians, and the latter enjoy great freedom of movement. The women and children are larger than the men. They do a good deal of the agricultural labour, as ploughing, hoeing and attending to the crops, and reaping; make cheese for sale as well as home consumption; the men, however, escape to Buenos Ayres to buy cotton and woolen cloths for summer and winter garments.

The government is almost entirely in the hands of a governor, who is elected by the Congress for a term of three years. The Congress consists of 10 deputies,—one from each of the 14 departments, except La Plata, which returns two deputies. The revenue is derived chiefly from customs duties, and the church property which was seized by government during the civil wars. The army consists in time of peace of 1000 men, but during war all males are liable to military service. The civil power is vested in the three judges; and, during the late war with Buenos Ayres a reserve corps of 900 or 1000 men mounted on horseback, who are said to have proved of great service in some engagements with the enemy. The inhabitants of Corrientes, who number about 10,000, are of the most peaceable dispositions; their only manner of entrance into the engagements with Buenos Ayres is by the opening of the navigation of these rivers a leading object in all negotiations. The army of Rossa was defeated Feb. 1481, by the army under General Urquiza, the governor of Corrientes, who mounted himself on horseback, and proceeded on board a British steam-vessel to England.
Coryphodon is a genus of Fossil Animals belonging to the family of Tapirs. The remains of this genus have been found in this country; and although closely allied to the genus Lophiodon of Courier, Professor Owen regards its distinctive characters as sufficient to separate it from that type. The specimen on which this genus was established is unique, and was dredged up from the bottom of the sea between St. Osyth and Harwich on the Essex coast, and now forms part of the collection of the Kent, Essex, and Hants Natural History Society.

The specimen is petrified, containing metallic salts and having the appearance of fossils from the London Clay. There is little doubt that it was originally imbedded in the Eocene Tertiary formation of the south coast of England of which it forms a part of the lower jaw, containing the last and part of the penultimate molar teeth of the lower jaw. Although this fragment resembles the same bone in the genus Lophiodon, yet a closer examination of the crown of the last molar tooth exhibits a smaller anterior-posterior diameter in proportion to its transverse diameter, as compared with the corresponding tooth in that genus. It also differs from the teeth of Anthracotherium, to which it has some resemblance. Professor Owen infers from this and other characters of these teeth that 'the whole dental series of the extinct Eocene Pachyderms offered modifications of the Lophiodont type of dentition, which led to that of the Anthracotherium, more especially of the smaller species from Garamo and Valely. From the Eocene horizon of Panama, Professor Owen believes to constitute a new sub-genus, the Anthracotherium, which has been described from specimens of that term. The genus Coryphodon, which I have proposed for this sub-genus, is derived from corrus, a point, and mori, a tooth; and is significant of the development of the ridges into points. The broad ridged and pointed inner surface of the tooth indicates its adaptation to accommodate the coarser kinds of vegetable substances; and it is very probable that the habits and food of the Tapir, which is the nearest existing analog of the Coryphodon, are not very different from those of the 'ancient animal of the last molar tooth of the lower jaw. The name Coryphodon, which I have proposed for this sub-genus, is derived from corrus, a point, and mori, a tooth; and is significant of the development of the ridges into points. The broad ridged and pointed inner surface of the tooth indicates its adaptation to accommodate the coarser kinds of vegetable substances; and it is very probable that the habits and food of the Tapir, which is the nearest existing analog of the Coryphodon, are not very different from those of the 'ancient animal of the last molar tooth of the lower jaw.' The name Coryphodon, which I have proposed for this sub-genus, is derived from corrus, a point, and mori, a tooth; and is significant of the development of the ridges into points. The broad ridged and pointed inner surface of the tooth indicates its adaptation to accommodate the coarser kinds of vegetable substances; and it is very probable that the habits and food of the Tapir, which is the nearest existing analog of the Coryphodon, are not very different from those of the 'ancient animal of the last molar tooth of the lower jaw.' The name Coryphodon, which I have proposed for this sub-genus, is derived from corrus, a point, and mori, a tooth; and is significant of the development of the ridges into points. The broad ridged and pointed inner surface of the tooth indicates its adaptation to accommodate the coarser kinds of vegetable substances; and it is very probable that the habits and food of the Tapir, which is the nearest existing analog of the Coryphodon, are not very different from those of the 'ancient animal of the last molar tooth of the lower jaw.' The name Coryphodon, which I have proposed for this sub-genus, is derived from corrus, a point, and mori, a tooth; and is significant of the development of the ridges into points. The broad ridged and pointed inner surface of the tooth indicates its adaptation to accommodate the coarser kinds of vegetable substances; and it is very probable that the habits and food of the Tapir, which is the nearest existing analog of the Coryphodon, are not very different from those of the 'ancient animal of the last molar tooth of the lower jaw.'
**navigation** of those rivers, thus enabling the produce of the republic to be shipped at the port of San Juan de Nicaragua, though it lies some 200 miles down the river on its lower course. The Estrella, the Arena, and the Baranca are among the more important. Several small lakes occur on the tableland.

**Climate, Soil, and Productions.**—The climate of Costa Rica is on the whole more regular and healthy than in other parts of Central America. There are two seasons, a dry season, which commences in November and lasts until April, and a wet season which occupies the remainder of the year. The climate is frequently oppressively hot, but more frequently is very healthy. In the rainy season thunderstorms of a very severe description are frequent.

The soil is of varied quality, but in many parts very fertile. On the most elevated districts there is a thin soil, and the soil descends, especially along the eastern coast, they are very abundant. A good deal of timber, especially Brazil wood, mahogany, and cedar is exported.

Around the town of Cartago and on the western and northwestern parts of the country, wheat is cultivated to some extent. Maize is grown much more extensively, and is exported somewhat largely to Chili and Peru. Corn is however the staple; it is of fine quality, and meets with a ready sale. Tobacco is raised to some extent on the table-land both for home consumption and for export. Sugar is an important article in the agriculture of Costa Rica; it is chiefly grown on the western side of the country, and exported from Puntá de Arenas. Cacao, indigo, &c., are also grown. All the chief interfluves or passes are producing abundantly except cotton, the vine, and cochineal, which are destroyed by the heavy rains. Agriculture however, though it is upon its agricultural produce that Costa Rica is chiefly dependent, is in a very backward state, and the capabilities of the soil are very far from having been made fully available.

The most common fruits are apples, pears, peaches, &c.; the vegetables the leguminous kinds, as peas, beans, lentils, &c., are the most common. There are some good pasture lands, and along the San Juan cattle forms an important part of the wealth of the country. Horses and mules are bred, but not in large numbers. Swine are raised in the low districts. Sheep are tolerably abundant on the table-land. Poultry are bred in great numbers.

Fish are very plentiful along the coasts and in the rivers. In the Gulf of Nicoya pears and the pearl-shells are obtained; also a shell-fish which yields a purple dye.

Several metals are said to exist, but gold is the only one which is worked. The most important gold mines are those of Aquacut not far from the gulf of Nicoya and Real del Monte. Coal is reported to have been found, but it is not worked.

The manufactures are confined to the coarse articles of home consumption. They consist chiefly of coarse cotton goods, common hats, coarse earthenware, furniture, wooden utensils, &c. The commerce appears to be steadily increasing.

The exports consist of coffee, of which about 16,000 cwts. are exported annually; hides, about 10,000 annually; with mahogany, cedar, Nicaragua wood, sarsaparilla, mother-of-pearl, and a small quantity of pearls. Grain, fruit, drugs, cattle, and poultry, and various miscellaneous articles likewise form a part of the exports. The total annual value is estimated at upwards of a million dollars. The imports amount in value to about three-fourths of the exports. The exports are chiefly made in British vessels. All the shipments are made from the Pacific ports, and mostly from Puntá de Arenas. The imports nearly all reach the northern states of Central America, Chili, Peru, and the West Indies. The imports from Great Britain consist principally of cotton goods, woollens, hardware, and other dry goods. Ccrapes and other China goods are brought largely in American vessels, as well as coarse stuffs. Silks, brandies, and trinkets are brought from France; wines from Spain. A commercial treaty was made with England in 1850.

**Agriculture.**—Costa Rica is divided into six departments—San José, Cartago, Guanacaste, Alajuela, Guanacaste, and Puntá de Arenas. The only towns of any importance are the capital, San José; Cartago, the former capital; and Alajuela and Villa Vieja on the western coast.

**San José,** the capital of the republic, population about 16,000, stands on the elevated table-land, 9° 46' N. lat., 84° W. long. Its site is said to be 4500 feet above the level of the sea.

It is a modern city, having grown up since the declaration of independence. It is the seat of the legislature, and courts of justice, as well as of the bishop, it has no buildings of any beauty or importance. It is however a busy commercial town. It communicates by a cart-road 72 miles long with its port, Puntá de Arenas, which is a thriving place, being the principal port of Costa Rica.

**Cartago stands at the base of the Volcano of Cartago,** about 16 miles E. by S. from San José; population about 6000. It was once the capital of Costa Rica, and of the great and splendid archbishopric. It has since been gradually neglected as well as political consequence, but in both respects it has given way to San José. In 1841 it was almost entirely ruined by an earthquake, which destroyed seven out of its eight churches and nearly 9000 houses. It has since been reconstructed, and its population is now about 10,000, stands nearly midway between San José and Puntá de Arenas, and is a place of some trade. A good deal of sugar is raised in the vicinity. Villas Vieja about 7 miles W. from San José, is likewise a place of some trade.

**Curridabat,** Asaari, Paraíso, Heredia, Barba, and Esparaz, are other towns of more or less consequence.

**Government.**—The government is in the hands of a president, elected for six years, and the assembly consisting of 12 deputies elected for three years. The chief court of justice is the Tribunal of San José, which is presided over by seven judges. The militia consists of 5000 men, of whom 200 are called upon at a time to form the army on duty.

During the Spanish occupation of this part of America, Costa Rica formed a part of the kingdom of Guatemala. After the declaration of independence by the Spanish American colonies, September 15, 1821, it remained for a short time united to the Mexican kingdom of Turib; but when the new federal union of the United States of Central America was established in 1823 after the model of the United States of North America, it formed one of the united states. On the dissolution of this short-lived union, Costa Rica declared itself an independent republic, and has so continued ever since.

**COTARJINNA. [CHEMISTRY, S. 1.]** COST, MANUFACTURE OF. London, Liverpool, and Glasgow, are the three great centres into this country, especially Liverpool; and the amount of this import is truly marvellous. Liverpool and Manchester often take opposite views of the cotton trade; they stand to each other in the relation of seller and buyer in respect to this commodity; and their interests frequently lead in opposite directions; but no such difference can affect the real magnitude of the trade. When we consider that Lancashire now contains nearly two millions of souls, that the Glasgow district contains seven hundred thousand, that the Yorkshire contains about two millions, and that the whole extent of the cotton manufacture includes these districts, and that Cheshire and Yorkshire, together with other counties, also contain their hundreds of thousands of cotton-workers—we can hardly fail to see how extremely important the regular supply of cotton must be to Great Britain.

In our previous article (vol. vii. p. 93) we have brought down the statistics of the supply of this important article to 1835. The vast increase of our manufactures has of course meant a vast increase in the demand for larger and better material for which the United States of America are still our chief source, and on the whole it is the best, the cheapest, and the most reliable. But the British manufacturer does not like to purchase foreign material, and this, particularly for a crop which is so likely to be affected by seasons, and of which the cultivation, which is by slave labour, he apprehends may be some day suddenly interrupted
For many years he has been looking out for places where a future supply may be looked for. But our East India possessions, Brazil, and Egypt (which is made to include Syria and a few other districts of the Mediterranean coast of Asia) have long furnished a portion of his material, but by no means enough to satisfy his wants. The cultivation of cotton has of late years, in the Sudan, in West Africa, and in the Cape of Good Hope, the West India Islands, and Guyana, among our own settlements; and recently Dr. Livingstone has stated the probability of obtaining a large supply from the interior of Africa with a likelihood at the same time of supplanting the slave-trade by occupying the natives in useful and profitable industry, instead of their barbarous and predatory wars. This, if ever realised, must evidently be a work of time. In our own settlements the price of labour seems on the whole to have increased to an amount considerable of the quantities we derive from thence; for though there has been a general increase, the supply is very irregular, and is not large. In the year 1856 the United States supplied 77 per cent, the British possessions 17, Brazil 21, Egypt 32, and other places 6 per cent. of the total quantities imported. A portion, varying from one-sixth to one-seventeenth, is re-exported in the raw state, for most of the European nations are competitors with ourselves in the cotton markets of the world. Hamburg, Amsterdam, Rotterdam, Trieste, Antwerp, and France (chiefly at Havre) collectively take about two-sevenths of the quantity imported into the United Kingdom. A part of this, as we have said, is sent from England, but on the other hand there is every year imported a quantity of cotton manufactures, chiefly as East India goods, stockings, fringe, yarns, &c., to the value of about 1,500,000L., which has not been included in the following statement of the import of raw material, and the declared value of exports from the year 1856 inclusive. We have given occasionally a statement of the sources whence the raw material is derived, as they show the enormous differences of the crops in different places, and sometimes that an insufficient supply from America has been in some measure made up by our considerable imports from Europe, especially from our own possessions; but we have not thought it necessary to repeat it for every year.

<table>
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<th>Year</th>
<th>Total</th>
<th>Exported</th>
<th>Manufactures</th>
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<td>7,123,956</td>
</tr>
<tr>
<td>1856</td>
<td>320,092,078</td>
<td>244,504,036</td>
<td>7,816,000</td>
<td>3,764,000</td>
<td>9,555,900</td>
<td>4,500,000</td>
</tr>
<tr>
<td>1866</td>
<td>275,189,914</td>
<td>199,504,036</td>
<td>5,655,900</td>
<td>2,560,000</td>
<td>8,555,900</td>
<td>3,500,000</td>
</tr>
<tr>
<td>1870</td>
<td>321,289,000</td>
<td>219,129,918</td>
<td>9,099,192</td>
<td>4,200,000</td>
<td>12,399,900</td>
<td>5,500,000</td>
</tr>
<tr>
<td>1880</td>
<td>442,022,810</td>
<td>314,399,918</td>
<td>15,099,192</td>
<td>6,000,000</td>
<td>17,099,192</td>
<td>7,000,000</td>
</tr>
</tbody>
</table>

Here was a large falling-off everywhere except in the British possessions, and in "other places," showing the efforts made to procure the raw material. Probably a portion was obtained from the confiscated south sea islands, and from the alluvial deposits of the Nile, but they are not mentioned as manufactures, however, do not appear to have suffered. The following year shows a large increase from the British possessions:

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Manufactures</th>
<th>Yarn</th>
<th>Manufactures</th>
<th>Yarn</th>
</tr>
</thead>
<tbody>
<tr>
<td>1856</td>
<td>321,072,810</td>
<td>15,715,867</td>
<td>7,123,956</td>
<td>15,715,867</td>
<td>7,123,956</td>
</tr>
</tbody>
</table>

In this year the importations from Egypt, which had been gradually declining, sank to 127,160 lbs., but rose the next year to 8½ millions, and in 1846 to 11½ millions.

In the year 1857, the duty on raw cotton was taken off, but from a deficient supply the manufacture declined, as also in the following year; nor did it recover itself till 1849.

Here are the figures for cotton vary greatly. Different countries, different years, different qualities in the same year, all lead to difference of price. Sea Island cotton always realises the best price, while Sumatra cotton is in this list; 1849 was a cheap year, while 1850 was a dear year; the lowest Sea Island (in the beginning of Oct. 1850) was quoted at 8½ per lb., while the highest reached 24½, and the average was 12½. As the very dear cottons are sold only in small quantity, the average price for 1849 was probably about 6½ per lb., and for 1850 about 8½. We give the prices varied at periods, ten years apart, with the latest prices of the so-called Orleans for America, and Perambuco for Brazil:—

<table>
<thead>
<tr>
<th>Year</th>
<th>New Orleans</th>
<th>East Indies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1850</td>
<td>91.54</td>
<td>80.54</td>
</tr>
<tr>
<td>1851</td>
<td>88.44</td>
<td>76.54</td>
</tr>
<tr>
<td>1852</td>
<td>86.54</td>
<td>74.54</td>
</tr>
<tr>
<td>1853</td>
<td>84.54</td>
<td>72.54</td>
</tr>
<tr>
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<td>82.54</td>
<td>70.54</td>
</tr>
<tr>
<td>1855</td>
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<td>68.54</td>
</tr>
<tr>
<td>1856</td>
<td>78.54</td>
<td>66.54</td>
</tr>
<tr>
<td>1857</td>
<td>76.54</td>
<td>64.54</td>
</tr>
<tr>
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<td>74.54</td>
<td>62.54</td>
</tr>
<tr>
<td>1859</td>
<td>72.54</td>
<td>60.54</td>
</tr>
</tbody>
</table>

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</tr>
<tr>
<td>1859</td>
<td>72.54</td>
<td>60.54</td>
</tr>
</tbody>
</table>

In the year 1856, the quantities exported were 9,038,491,591 yards of cotton cloth of the declared value of 28,527,7680; 59,653,958 yards of lace and patent net, value 43,252,784; 5,442,332 lbs. of thread for sewing, value 883,383,12; 1,009,519 dozen pairs of stockings, value 306,666; and other descriptions of manufactures to the value of 370,685, independent of the yarn. The following table gives the products with the places to which they were sent in the first eleven months in 1857:

<table>
<thead>
<tr>
<th>Country</th>
<th>Quantity</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>32,507,592</td>
<td>51,760,790</td>
</tr>
<tr>
<td>France</td>
<td>29,630,290</td>
<td>45,822,211</td>
</tr>
<tr>
<td>Italy</td>
<td>116,244,309</td>
<td>164,021,610</td>
</tr>
<tr>
<td>Egypt</td>
<td>169,985,234</td>
<td>231,629,943</td>
</tr>
<tr>
<td>Russia</td>
<td>189,159,154</td>
<td>252,612,043</td>
</tr>
<tr>
<td>Portugal</td>
<td>29,630,290</td>
<td>45,822,211</td>
</tr>
<tr>
<td>China and Japan</td>
<td>110,760,781</td>
<td>170,760,781</td>
</tr>
</tbody>
</table>
The total declared values of the cotton exports for the first eleven months of 1857 are as follows:

### Cotton Yarns

<table>
<thead>
<tr>
<th>Country</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea Island</td>
<td>10,990</td>
</tr>
<tr>
<td>Stirling</td>
<td>630</td>
</tr>
<tr>
<td>Bewed</td>
<td>86,940</td>
</tr>
<tr>
<td>Alassa</td>
<td>120,920</td>
</tr>
<tr>
<td>Alabama and Mobile</td>
<td>105,590</td>
</tr>
<tr>
<td>Parma, Aracati, &amp;c.</td>
<td>19,700</td>
</tr>
<tr>
<td>Bahls and Macrot</td>
<td>7,280</td>
</tr>
<tr>
<td>Marasam</td>
<td>8,520</td>
</tr>
<tr>
<td>Surinam</td>
<td></td>
</tr>
<tr>
<td>Demerara</td>
<td>70</td>
</tr>
<tr>
<td>Barbados</td>
<td>570</td>
</tr>
<tr>
<td>Lugarnam</td>
<td>110</td>
</tr>
<tr>
<td>Ortheagen</td>
<td>3,170</td>
</tr>
<tr>
<td>Payor</td>
<td>1,070</td>
</tr>
<tr>
<td>Common West India, &amp;c.</td>
<td></td>
</tr>
<tr>
<td>Bombay</td>
<td>15,020</td>
</tr>
<tr>
<td>Egmy</td>
<td>141,030</td>
</tr>
<tr>
<td>Rissi</td>
<td>3,860</td>
</tr>
<tr>
<td>Madras</td>
<td>160</td>
</tr>
<tr>
<td>Bengal</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>400,300</td>
</tr>
</tbody>
</table>

At the same period there were 41,290 bales, chiefly East Indian, in stock in London; and 10,920 in Glasgow, making a total of 422,710 bales.

The quantity of cotton used in the mills of this country does not always show the quantity of work done. The quantity thus consumed was enormously greater in 1848 than in 1847, and a little greater still in 1846; but the quantities of work done, and wages paid, did not increase in a similar ratio. The latter two elements depend in great measure on the weight of cotton used in making a particular size of cloth or yarn. In some states of the market, heavy goods pay the manufacturer better than those of lighter texture; and at such a time the consumption of cotton is increased, though neither the manufacturers' profits nor the workmen's wages may have reached a higher aggregate. In some cotton fabrics the latter element is predominant in the whole value; in others it amounts only to one-fifteenth; in those exceptional cases; and between them every kind of ratio is observable in some or other of the numerous varieties of manufacture. In the case of yarns, the material is worth three-fourths of the whole price in some specimens, and only one-twelfth in others. A given number of spindles, employed in making cotton twist of the thickness called No. 20, would use up 1340 lbs. of cotton, in the time which would elapse in producing No. 30 out of 840 lbs., No. 40 out of 580 lbs., and No. 60 out of 224 lbs.; in the high Nos. the relative value of the labour is higher, and consequently the relative value of the material lower, than in the low Nos. In some of the gigantic cotton mills 30,000 or 40,000 lbs. of cotton less will be used in some weeks than in other weeks to turn out the same total length of yarn. The machinery and all the hands may be employed at both periods; the difference arising from fine light goods being made at one time, and coarse heavier goods at another. When the demand for printed muslins and other light goods is less than that of domestic or coarse cotton goods, the consumption of cotton in England is found to lessen. An advance in the price of cotton is much more strongly felt in respect to coarse goods and yarns, than in fine; so much so, indeed, that the demand from many manufacturers in the home market is cut down, if the price fluctuates beyond its usual limits; whereas in light goods, wherein labour forms a large ratio of the selling price, a rise in the price of the raw material is not so sensibly felt. Whenever the supply is deficient and the price high, the manufacturer has an inducement to produce light goods instead of heavy; and for a like reason, when the demand is slack, there is less dead weight of such capital in a stock of light goods than of heavy goods of equal market value.

The argument put forth to show that we ought not to continue to be so much dependent, as we now are, on the United States for our supply of cotton, are somewhat as follows:—That our yearly supply from other quarters has been gradually decreasing; that the price of cotton is now and is likely to be more variable for consumption increases in a less ratio, so that it can only be kept up by encroaching on the reserve store; that the United States is the only country where the growth of cotton is materially on the increase, and this increase is not equal in rapidity to the increase in heavy manufacturing or consuming power in Europe and the United States; that no stimulus of price can materially augment the increase of supply in the United States, since the planters always grow as much cotton as the negro population can pick; and consequently, if the cotton manufacture of this country is to increase, it can only do so by applying a great stimulus to the growth of cotton in other countries adapted to the culture.

While these "other countries" are to be, is a question whereon much difference of opinion prevails. In the early stages of the cotton manufacture, the countries surrounding the Mediterranean furnished us with nearly our whole supply. In the 18th century the West Indies provided the chief cotton supply; but at present the Mediterranean and the West Indies combined furnish a very insignificant ratio. Brazil, Egypt, and India, have successively entered the market; Australia and South Africa have recently done the same; and the question arises, which of these countries will furnish a supply which will materially lessen our dependence on the United States? The Manchester authorities themselves are at issue on this matter; for while some point to the East Indies as the source of an inexhaustible supply, others feel reliance on our own colonies in the West Indies, Africa, and Australia.

Since 1835 there have been no inventions to alter materially the processes of manufacture in cotton, but the improvements in the machines have greatly facilitated the production in most of the various branches both of weaving and printing.
the parties consent in writing, claims to any amount may be
be brought. (Blackstone's Commentaries, Mr. Kerr's edition, vol. viii, p. 136.)

On the motion of the Crown for the issue of an ordinary action (16 & 17 Vict. c. 107). Questions between the Crown and any party liable for Succession Duties (not exceeding fifty pounds) may also be determined in this Court; the decision of the judge in such cases also being final (16 & 17 Vict. c. 107).

The County Courts are essentially local courts, for to give jurisdiction the defendant must reside within the district of the court, at the time of the action being brought. By leave of the Court, however, an action may be brought where the same thereof arose within the district of the Court, in cases in which the defendant or one of several defendants has dwelt or carried on business in such district within six months. The Court has also jurisdiction to give a landlord possession of his land to be sold. The officers of the Court, so far as they are necessary in the administration of the Court, are elected annually, and no fine has been paid, where the tenant's term has determined, or he has received notice to quit, or where the rent is half a year in arrear.

If jurisdiction in this century is explained elsewhere (Ch.2). The County Court has an exclusive jurisdiction in determining the claims and disputes of the members and officers of Friendly Societies, Industrial and Provident Societies, and of Literary and Scientific Institutions (18 & 19 Vict. c. 265). His Excellency the Governor of the Colony, and in the appointment of trustees to, and in the regulation of, all charities within the district of the Court, of which the gross annual revenue does not exceed 30£. [Charters, S. 2.]

A society owning land may, in the name of the office of the County Court, which sets out the names of the plaintiffs and defendant, and the nature of the action. Thereupon a summons is issued, a copy of which is served on the defendant by one of the bailiffs of the Court, requiring the defendant to appear, which he may do, if he is at the Court in which he is summoned, or have judgment given against him. If defence is made, the matter in dispute is, on the trial, inquired into, and disposed of summarily by the judge, who is to decide all questions, as well of the title as of the action in which he is summoned, and to determine a jury for the trial of matters of fact; for in actions for sums above 50£, a jury of five may be obtained as of right; in this case the facts are to be tried by the jury.

In actions for more than 50£, an appeal lies to either of the sessions of the court in which the action is tried, and the decision of the judge in matter of law, or in the reception or rejection of evidence. No appeal lies against his decision in matters of fact.

The Court, which is held once a month, is a court of record. On its judgment execution may be issued against the goods of the unsuccessful party. If he has nogoods, but has the means of paying, and refuses to do so, he may be punished, after inquiry into his circumstances, by imprisonment for a period not exceeding forty days; or the judgment (if for more than 50£) may be recovered as of the superior courts, and enforced there by the ordinary process of execution.

To encourage suitors to resort to this Court, the plaintiff in the superior courts (in suits in which they have concurrent jurisdiction with the County Court) and the defendant, where he recovers less than 50£, and in actions of tort where he recovers no more than 50£, unless the judge who tries the case certifies for costs, or it appears that there was sufficient reason for bringing the action in the superior court. Previous to the passing of this Act (1883), the Courts of Bankruptcy had, by the statutes 5 & 6 Vict. c. 116, and 7 & 8 Vict. c. 96, called usually the 'Protection Acts,' jurisdiction to grant to any person who was a trader owing less than 100£, in all, or who was so a trader within the bankrupt court, an order upon the bankrupt for the recovery of goods. This jurisdiction was, by the statute 10 & 11 Vict. c. 102, vested in the County Court, and the Court for the Relief of Inebriate Debtors, in London. [Parochial Acts, S. 2.] In the County Court, also, may now be tried all actions of replevin. [Hartshorn, S. 2.]

The judge has also power to grant a warrant for the arrest of an absconding debtor, and by statute 17 and 18 Vict. c. 104, to direct a vessel which has caused injury by collision or other fault to be arrested at any port for the injury, or security given to abide the event of legal proceedings.

The nature and jurisdiction of this Court have been described thus fully, in giving the course of the recent erection of these tribunals, but of the extent and variety of the powers vested in them, and the important position they have taken in the estimation of the people. (Blackstone's Commentaries, Mr. Kerr's edition, vol. viii, p. 136.)

The Courts of Convenience, anticipated in this article on the subject ('Penny Cyclopedia,' vol. viii, p. 115), took place in 1846, in the re-organisation of the County Courts, with a simple and inexpensive procedure, and a professional judge in lieu of the Sheriff and Justices of the peace.

The County Court, has also been abolished, and provision made for the surrender of the inferior local courts by corporations and the lords of manors and hundreds. Most of these indeed have long been as much in desuetude as the court of piepouidea. Many of the more important borough courts have however obtained a renewed vitality, by having the provisions of the Common Law Procedure Act of 1853 and 1854 extended to them, by order in Council. This has, of course, produced some anomalies. An instance is the trial of Liverpool & Manchester Bank, brought annually before a jury, who in the absence of the Board himself commanded to enter an appearance at Westminster by the Queen; obliged to obey a like order to appear at Lancaster by the Duchess of Lancaster; threatened with judgment for non-appearance by the Mayor of Liverpool, if he fail to appear at the Court which, as it befits his rank, he is required to answer a plaint in the County Court of Lancashire holden at Liverpool. As to the alterations which have been made in the jurisdiction of other courts, see BANKRUPT, S. 2; EQUIT, S. 2; Psoar, S. 2; Divorc, S. 2.

COWPER, EDWARD, was born in 1756. Little or nothing has been published concerning the circumstances and events of the early life of this distinguished inventor and improver of machinery. It is known however that it was while working on his invention that it was observed that Mr. Applegate was induced to build the extensive printing-office in Duke-street, adjoining to Stamford-street, London, now occupied by Messrs. Clowes, and he was a partner with Mr. Applegate in that establishment. They were also connected in making machines for calico-printing, and in the construction of new machinery for printing the 'Times,' of which, in conjunction with Mr. Applegate, he published a description. In fact, some of the most important improvements in the apparatus and machinery of the invention, such especially as the giving a diagonal action to the rollers on the self-acting inking-tubs. In the Great Exhibition of 1851 he exhibited a model, made by T. B. Winter, a student in King's College, London, of the printing-machine now in general use. Many of the improvements in the Great Exhibition were printed. He had for many years an engagement at the large blacking-factory of Messrs. Day and Martin, in printing their labels in such a manner as to defy imitation. He furnished some contributions to the 'Penny Cyclopedia,' one of which was an elaborate article on a 'Button.'

Mr. Cowper, during some of the later years of his life, was professor of mechanics and manufacturing arts at King's College, and it is as a lecturer that he was best known to the public. His course of imparting knowledge consisted not only in giving descriptions, and illustrating them by models, but in exhibiting the machines themselves, and showing them at work. His manner of lecturing was simply and popular, and he had always a full attendance. His knowledge of machinery, of mechanical construction, and the mechanical arts, embued the most minute as well as the largest objects. He delivered lectures on the mechanical structure of the Crystal Palace of 1851. He was much respected for his inventiveness, and his words are so rich in language, so full of economy, so full of mental principles, and so sound in thinking, that his ideas are rich in substance; partly a德尔挖掘机, partly a rudely aggregated deposit of
sand, shells, pebbles, and bones. To these divisions, whose origin is due to different local conditions, and successive times, Mr. Crawford added that of Coraline Grag, and Mammaliferous Grag. The position of theseheads will be best seen from the following table of the classification of the Tertiary Rocks from Professor Aasted's 'Elementary Geology.'

Newer Tertiary, or Pliocene Series:
1. Lower Gravel and Sand.
2. Till.
Middle Tertiary, or Miocene Series:

CRANBROOK. (Kern.)

CRASSULA, a genus of plants, the type of the natural order Crassulaceae. It has a 6-parted calyx, much shorter than the corolla; sepals flatish; the petals 5, stellate, spreading, distinct; the stamens 5, filaments awl-shaped; the scales 5, ovate, short; carpels 5, many-seeded. The species are very numerous. They are succulent herbs or shrubs, and are mostly natives of the Cape of Good Hope. Their leaves are opposite and entire, or nearly so. The flow- ers are mostly white, but some are yellow, if not coloured. Of the fifty species that have been described, and of many of them, on account of their grotesque appearance, are cultivated in our gardens. They are greenhouse plants. One species, C. tetragonos, is used in making a W.Hope as a remedy in dysentery. Any medicinal properties they possess is probably owing to the presence of tannin.

CRAWFORD, THOMAS, an eminent American sculptor, was born at New York on the 22nd of March, 1813. At school he obtained some acquaintance with Greek and Latin literature, but, as is frequently the case with youths in his country, he seems to have been allowed in early life to follow very much his own course. Like Chantray, his earliest instructor, the chisel was a carver in wood. Whilst with him however his strong desire for higher training began to develop itself. He formed a collection of casts of ancient and modern works of a high class, and he learnt to model in clay. At length he was placed as a pupil under Mesmer, Frazee and Lannitz, and entered as a student the academy of design in New York. Mr. Lannitz urged him to proceed to Rome, and gave him a letter of introduction to Thorwaldsen. Accordingly he proceeded to Italy in 1834, and was received into the studio of Thorwaldsen, to whose friendship he was greatly indebted. Thrown by the death of his father on his own resources, he for some time supported himself by making busts. The first poetical work of his which attracted particular attention, was the statue of Orpheus, destined by Thorwaldsen to a place among the statues of the great men of past ages. The statue was never finished by an attack of brain-fever, the precursor of his premature fate. On his recovery he completed the Orpheus in marble, a commission having during his illness arrived for it from the Boston Athenæum. It excited general admiration and anticipation. He worked on diligently, gaining in executive skill and confidence, and rising steadily in reputation.

Among the chief of his earlier works are his 'Herodias' with the head of John the Baptist; 'The Babes in the Wood;' 'Flora;' and 'The Dancers'—two life-size statues of children, which have had considerable popularity. Among the best of his later works are his bronze statue of Beethoven, now in the Athenæum at Boston, America; the equestrian statue of Washington, which stands in the square at Richmond, Virginia; and the more ambitious allitoilevls of the 'Progress of Civilisation in America,' which he was commissioned by the federal government to execute for the pediment of the Capitol at Washington. Others of his works are his statues of the Dean of St. Paul's, A Shepherdess; 'David;' and 'Prayer;' his groups of 'Adam and Eve,' of heroic size; 'A Family suffering under the plague of Flies Sarpent;' 'The Baby attempting to save herself and Child from the Deluge;' and his ideal busts of Sappho, Vesta, &c. He also made numerous designs for bas-reliefs: Illustrative of the Old and New Testaments; the poets of Greece, Italy, and England; events of American history, &c., as well as several models of leading American statesmen.

For a short time after entering Rome, Crawford made that city his home. He had just completed a new and spacious studio, in order to work with more convenience at the numerous commissions which awaited completion, when he was stricken with a disease—tumour on the brain—which rendered him unable to perform his work. To the care and attention he received from the learned and humane French and Italian doctors he owed the benefit of medical advice, but failed to obtain relief, and died in London on the 8th of October, 1857. Crawford was a sculptor of a very high order of merit, not reaching to the first rank, but coming close to it. His works display originality rather than refinement, or power rather than technical skill. Casts of some of his statues are in the Crystal Palace at Sydenham.

CREA. [Ralliaed.]

CREWE, Cheshire, a town in the parish of Coppenhall and hundred of Nantwich, is situated in 53° 6' N. lat., 2° 56' W. long. In 1891 the census gives the population of the town to be 6,896, and the population of the town and its suburbs 13,076, or 11,61 miles square. The town is on the Grand Junction Railway, the branch to the town being opened in 1851.

The town of Crewe owes its erection entirely to the formation of the London and North-Western line of railway. The inhabitants consist chiefly of persons in the employment of the railway company, with their families. The houses and shops are well built; the streets are wide, and the footpaths are laid with asphalt. The town is lighted with gas, and well supplied with water, a powerful steam-pump supplying at one time the engines in the extensive workshops of the company, and the waterworks are under the management of the railway company. The water is intended to be used by the inhabitants passes through two filtering processes before reaching the houses. Bathhouses are also provided at a cheap rate. The town of Crewe has a council for the management of the affairs of the community. The members of this council are elected by the workmen and inhabitants, and one-third by the directors of the railway company. A church has been erected by the company: the Wesleyan, Primitive, and New Connexion Methodists, Independents, Scotch Presbyterians, Baptists, and Roman Catholics have places of worship. Schools are held for boys, girls, and infants have been provided by the company, and a library and a mechanics' institute are supported by subscription. Medical attendance and medicine are secured for the workmen and their families on payment of a small weekly rate, the highest charge (that for a married man with a family) being 2d. per week. A field in the neighbourhood is used for cricket-playing. The railway station at Crewe is very spacious. From this place branch off five lines of railway, affording ready means of communication with all parts of the country. The workshops and machinery of the North Western Railway Company at Crewe are on a very extensive scale. Railway carriages and locomotive engines are mass manufactured and repaired. The number of carriages of all kinds maintained at Crewe amounts to about 700, of which 100 are at a time usually under repair. Crewe Hall, the seat of Lord Crewe, is in Crewe township, about one mile from the railway station.

CRISEUS, a Thracian king. [Herod. ii. 8, 29; Steph. Byz.]

CRISTIANS, a race of men, who were first discovered by the Portuguese, in the 15th century; they inhabit the island of Madagascar, between 40° and 50° south latitude, and 30° west of the meridian of Greenwich. They are of a light brown colour; dwell in small villages; and live entirely by commerce, which they cultivate with the greatest skill and industry. Their dress is very simple: their habit is a cloth, and a strip of cloth round the waist. Their arms are the bow and arrow, and the machete. Their religion is very simple: they have no images; and their priests are called Jackals, and are not allowed to eat meat. They have been described by several travellers, as the most industrious, the most religious, and the most virtuous race of people in the world.
Mull of Cantyre. The project of forming this canal was first started about sixty years back, with the co-operation of the then Lord Provost, Sir John Bennie having surveyed the ground and reported favourably, an Act of Parliament was obtained, a company was formed in 1798, and the works were forthwith commenced. The canal was opened in 1801. The canal, although not more than 9 miles in length, has been of outstanding importance in the west of Scotland and the Highlands; the original shareholders of the canal company, however, have never received any return for the outlay of their capital. The number of locks in the canal is 11, the average breadth is 24 feet, and the depth of water 10 feet; 12 necessary 125 feet deep, in which no water could be maintained. Since 1816 the canal has been under the management of the Commissioners of the Caledonian Canal, with the navigation of which it is intimately connected; and these canal improvements formed important part of the inland passage between Glasgow and Inverness. Vessels of 200 tons burden can pass through the Crinan Canal.

CROKER, RIGHT HONOURABLE JOHN WILSON, was the representative of a branch of an ancient family which was settled for many generations at Linhean, in South Devon. A member of this family emigrated to Ireland about the year 1600, and his sons distinguished themselves at the capture of Waterford in 1650. Various descendants of this branch of the family, who have been prominent in Ireland, of whom, were increased from time to time by marriages with influential families. Mr. Croker, the father of the subject of our present memoir, was, for many years surveyor-general of Ireland, and he began his career by entering into an apprenticeship to a merchant. He married with Hester, daughter of the Rev. R. Rathborne, he had an only son, John Wilson Croker, who was born in Galway, December 20, 1790.

After receiving his early education at a school in Cork, where he displayed great precocity and an inquisitive disposition, he was entered at Trinity College, Dublin, at the age of sixteen, under the late Dr. Loyd. He soon began to show extraordinary readiness and ability by the part which he took in the 'Historical Debating Society,' since superseded by the 'University Debating Society.' He began also to put out and developing the characters of young men, and preparing them for their appearance afterwards on the stage of public life. So highly did the society esteem the share taken in its proceedings by Mr. Croker, that it voted him its first gold medal. Intended by his parents for the study of the law, Mr. Croker had no sooner taken his B.A. degree in 1800, than he was entered as a student at Lincoln's Inn; but he continued to reside in Dublin, and to mix with the society of that city. He had obtained a situation as a shorthand writer, and he had leisure hours on his hands, and these he devoted to literature. His first production as an author, if we except a short paper of mere ephemeral interest, was a series of 'Familiar Epistles to J. F. Jones, Esq., on the Present State of the State of Ireland,' 1806, compiled from much information, as followed in 1806 by his 'Intercepted Letter from China,' both anonymous. Both were clever and caustic satires, excited much curiosity and attention, and ran speedily through several editions.

In 1807 he published a work of a graver kind on 'The State of Ireland, Past and Present,' in evident imitation of the treatise of Tacitus, 'De Moribus Germanorum.' In this pamphlet he strongly advocated Catholic emancipation. At the close of the preceding year Mr. Croker was employed as counsel for Sir Josias Bowley, at the election for Downpatrick. Sir Josias withdrew just before the election, and Mr. Croker was nominated in his place, but was defeated by a small majority. In the following May however he returned for Downpatrick, on an impeachment petition.

He had not been long in parliament when an opportunity offered for the display of his oratorial powers. Early in 1809 the Duke of York was brought practically upon his trial in the House of Lords, consisting of the Hereditary Guards, and the most and best successful speech made in defence of his Royal Highness against Colonel Wardle's motion of censure, was delivered by Mr. Croker on the 14th of March. This speech contained a minute dissection of the evidence for the right forward against the duke, and was couched in vigorous and pointed language. It may be presumed that the grateful sense which his Royal Highness thenceforth entertained for this support hastened the advance of Mr. Croker to office. In the course of the same season the late Duke of Wellington, then Sir Arthur Wellesley, and chief secretary for Ireland, being obliged to repair to Dublin, entrusted to Mr. Croker the parliamentary business connected with that country. He fulfilled the trust with much ability and discretion, that shortly afterwards Mr. Pelham, when he formed his ministry in 1809, offered to Mr. Croker the post of Secretary to the Admiralty. For upwards of twenty years Mr. Croker continued to discharge the duties of this office with great success, and by the appointment of First Lords of that department, and under King William IV. when Lord High Admiral. During this time he sat in parliament for various boroughs; amongst others for Aldborough, Yarmouth, and Bodmin; and in 1827 he had the satisfaction of winning the election to the Admiralty Board by the nomination of Lord Plunket to the chancellorship and peerage, with whom he had twice unsuccessfully contested the seat; but his views being in favour of Catholic emancipation, Mr. Croker was again defeated. He took a very prominent part in the parliamentary committee appointed to consider the question of erecting New London Bridge; and his zeal for science and literature was shown in another way soon afterwards, by founding the Athenæum Club. He was amongst the earliest advocates of the state encouragement of the fine arts. His speech on the proposed purchase of the Elgin marbles was much in advance of the general tone of parliament on such subjects. When the Reform Bill was proposed, Mr. Croker opposed it at every stage by powerful speeches and a ready pen, as he considered it a revolutionary measure.

The passing of the Reform Bill compelled Mr. Croker to withdraw from parliamentary life. Even during the most active portion of his legislative career he had been much unemployed. His printed speeches and pamphlets on current political questions amounted to a very considerable number, and his contributions to the 'Quarterly Review,' extending over more than a quarter of a century, would alone fill several volumes. His most extended work, however, was in the field of 'History.' His 'History of England,' in 4 vols., 8vo, published in 1821, which was handled with considerable severity by Mr. Macaulay in the 'Edinburgh Review.' His poems of 'Ulm and Trafalgar,' and 'Talavera,' are the best known and most admired of his productions. 'A History of the Decline and Fall of the Roman Empire' is a highly popular book for children. The following is a list of the most important works not mentioned above, which were either published or edited by Mr. Croker: 'A reply to the Letters of Malachi Macarogruhel,' 'Military Events of the French Revolution of 1830,' 'Letters on the Naval War with America,' and 'Songs of Trafalgar.' He was also the author of several lyrical poems of merit, including some touching lines on the death of Mr. Canning, which occasioned his own death in 1819. He had also edited the 'Suffolk Papers,' 'Lady Hervey's Letters,' 'Lord Hervey's Memoirs of the Reign of George II,' and 'Walpole's Letters to Lord Hertford.' He died August 10, 1857.

CROKER, THOMAS CROFTON, was born January 15, 1762, in the city of Cork, son of General James Crofton, Major of Major Thomas Croker, of the 38th regiment of foot. At the age of fifteen he became an apprentice in a mercantile establishment in Cork. Between the years 1812 and 1816 he made excursions occasionally on foot in the south of Ireland; and it was during these rambles that he commenced making his collections of the legends and songs of the peasantry in Ireland. In the year 1816, Moore, in an advertisement to the 7th number of the 'Irish Melodies,' expressed his obligations to him for about forty Irish airs which he had sent, for many curious fragments of Irish poetry, and for several interesting local traditions. Crofton Croker had also acquired considerable skill in making pen-and-ink sketches, and some of them were exhibited at Cork in 1818.

Major Croker died in 1818, his widow soon afterwards made application to Mr. John Wilson Croker, then secretary to the Admiralty, who was a friend of the family, but no relation; and through his interest in February, 1819, Thomas Crofton Croker was admitted to the inner bar, receiving the salary of 24l. a week. While in this situation he contributed to the introduction of lithography into the Admiralty 'as a substitute for transcribing several copies of the same document, and for confidential columns; and he had for many years been a member of the secret committee of the Admiralty. He subsequently became a clerk of the first class, with a salary of 800l.; and he retired in 1850 with a pension of 880l.

Mr. Crofton Croker's first literary work was his 'Researches in the South of Ireland,' published in 1824, in 4to, and con-
sisting for the most part of the notes made during his early
excursions in 1812-1815, and during a sojourn of four
years in his native city. His works include the "Fairy
Legends and Traditions of the South of Ireland," London,
1828, 3 vols. Sm. 8vo. In the first edition of this work he
was assisted by Dr. Maginn, Mr. Pigott, and Mr. Keightley; but the materials supplied by
his associates, or at least most of them, were afterwards
omitted. A second edition was illustrated with etchings,
after sketches by Maclise, then, as Croker states, "a young
Irish artist of considerable promise." The "Fairy Legends"
appeared in 1834 in one volume, forming a part of the
"Fellows' Magazine," which was eventually a very
successful monthly journal. In 1833, the year in which he
produced a long complimentary letter from Sir Walter Scott;
and on the 30th of October 1836, he was introduced to
Sir Walter at the residence of Mr. Lockhart in Pall Mail. His
personal appearance is thus described in Scott's Diary —
"A small, thin man, not at all what I should have
expected, a very easy and winning manner, and a strong
possessing manner, something like Tom Moore."

In 1835 Mr. Croton Croker published "Legends of the
Lakes, or Sayings and Doings at Killarney, collected chiefly
from the manuscripts of Rev. D. Adolphus Lynch, Esq., R.P.
King's German Legion," London, 2 vols. Cr. 8vo. This work
was followed in 1838 by two small novels — The Adventures
of Barney Mahoney, and My Village versus Our Village,
of which the first was very favourably received, but the second
was omitted. He published a volume of "The Popular Songs
of Ireland," 1830. He was a contributor to some of the
annuals which were in fashion about 1830-40, especially to
The Amulet, and Friend's Offering; and he edited for two or three years The Christian
Magazine, a monthly journal of much importance, for
antiquties, and he was early elected a Fellow of the Society
of Antiquaries. He was chosen a member of the Royal
Irish Academy in 1827. He took part in the foundation
of the Camden Society in 1839, and of the Percy
Society of Cumberland, and was a member of these societies, and he edited some of the works published
by them. When the British Archaeological Society was
founded in 1843, he became one of the Committee. He was
also a member of the United Service Institution, of the Irish
Archaeological Society, of the Numismatic Society, of
the Hakluyt Society, and he was perpetual president of the club
of antiquaries called the Society of Noviuganians. He had
collected an extremely interesting museum of Irish anti-
quities, and he offered the collection to the nation, but
he died at his residence, Old Brompton, London, August 8, 1864.

CROMBIE [DUNDEE]

CROMBIE [DUNDEE]

CROSIE, ANDREW, a celebrated experimenter on
electricity, was born in 1770. He was a solicitor in Court, in the parish of Lochgilp in Argyllshire, on the Quackton Hills in Somersetshire, on June 17, 1774. His father was the proprietor of the estate, to which he succeeded in 1800. He was educated at the school of the Rev. M. Sayer, at Barmouth; and he had for school-fellows W. J. Broderip, the Rev. John Ewing, and other equally celebrated men. In 1802 he matriculated at Brasenose College, Oxford, where he was very uncomfortable, the habits, especially that of drinking, being particularly unsuited to him. He returned home in June 1803, on account of the illness of his mother, who shortly afterwards died. Even when at school he had
become greatly attached to the study of electricity, and on
settling on his paternal estate he devoted still more of his
attention to the subject. He provided himself with electrical apparatus, and pursued his experiments wholly independant of
theories, and searching only for facts. In a cavern near
his residence, called Holweil Cavern, he observed the sides
and roof covered with aragonite crystallisations, and his observations enabled him to conclude that the crystallisations
were the "effects, at least, we may say, of electricity." This
induced him to make the attempt to form artificial
crystals by the same means, which he began in 1807. He
took some of the water from the cave, filled a tumbler, and
exposed it for some days to some Bosch's acid, and, alone, letting the platinum wires of the battery fall on opposite
sides of the tumbler from the opposite poles of the
battery. After ten days of constant action he procured crystals
of carbonate of lime, and subsequently by altering the arrange-
ments he produced them in six days. He found however
that darkness was essential to the certainty and rapidity of
their production. He carried an insulated wire above the
poles of the battery, and divided the water into two parts, one
quarter, afterwards shortened to a distance of 1,800 feet.
By this wire, which was brought into connection with his
apparatus in a chamber, he was enabled to see continually
the changes in the state of the atmosphere, and could use the
fluid so collected as a dry battery. In 1816, at a meeting of country gentlemen, he propagated "that, by
means of electrical agency, we shall be able to communicate
our thoughts instantaneously with the uttermost ends of the
earth." But though he foresees the powers of the medium,
it did not occur to him to apply it in connection with the
propagation of electromagnetism, in the form in which they are produced by nature, including one, sub-niteplate of copper, an entirely new mineral neither found in nature nor
formed by art previously. His belief was, that even diamonds
might be formed in this way. Still he worked alone; he
published none of his experiments to the world, and he pro-
ounced no theories. At length, in 1836, the British
Association for the Advancement of Science held its meeting
in Bristol, and Mr. Crosse attended it, intending to be an adderly
only to the meeting. While there, he met some scientific gentlemen there, he was induced to explain them
publicly, and though unprovided with apparatus, they were
so struck with the importance of the facts, that he was publicly
complimented by the president, the Rev. Mr. H. Crosse, and
other members, as the second greatest experimenter, after Professor Sedgeick, and others. A few months after this meeting, while pursuing his
experiments for forming crystals from a highly caustic solution
out of contact with atmospheric air, he was greatly sur-
prised, as he states, to find that his crystals had a highly red
and reduced to powder, was mixed with carbonate of
potash and exposed to strong heat for fifteen minutes.
The mixture was poured into a black-lead crucible in an air
furnace. It was reduced to powder while warm, mixed with
boiled water, and brought to a boil. The council of the Royal
Society at that time was under the presidency of the Rev. Mr.
Weeks, of Sandwich, afterwards produced them in fer-
rocyanurall of potassium. This discovery occasioned great
excitement at the time. The possibility was denied, thought
then, if this was the case, it was as great a discovery as those
similar appearances in his own electrical experiments; and
he was accused of impiety, as aiming at creation. He
was much hurt by these attacks, for he was a truly pious man.
He says he was inclined to believe that the insects were
produced by a certain kind of fermentation, similar to that
which caused the vinegar to ferment; and adds, "I have formed no visionary theory that I would travel out
of my way to support." He attempted to give no explanation of what he admitted he could not comprehend,
and in answer to a personal question, who had written to him, calling
him " a reviver of our holy religion," he replied that he was
sorry if the faith of his neighbours depended on the claw of
a mite. These insects, if removed from their birthplace, live
and propagate, but uniformly die on the first recurrence of
heat, and are entirely destroyed if they fall back into the
fluid whence they arose. This was the most remarkable
of his discoveries; but his labours were in some instances more
useful. He invented a method, which was patented by
others, for purifying sea-water by electricity, which water
was subsequently made use of in some cases. He was also
capable of being used for the improvement of wines, by
removing the predominance of bitartrate of potash; to the
improvement of spirits by removing acidity; and to the
stopping of the fermentation of cider. He also made expe-
rimented on the use of electricity in the vegetable kingdom; he
noted that positive electricity advanced the growth, as was
shown by the cultivation of two vines by Mr. Boys of Margate; and
that negative electricity favoured the growth of fungi, and
induced them to grow like the rot in the potato. Mr. Andrew
Crosse did not confine his labours to the vegetable and
mineral worlds. Though living chiefly on his estate in the country, he took
an earnest part in all local affairs. He was an active magis-
trate, just, but benevolent; he advocated the instruction of
the poor, and he gave lectures on various subjects to the
neighbouring institutes; he left a quantity of poetry, con-
siderably above mediocrity, which he could not be induced to publish in his lifetime, but which has been given to the world by his widow, in a memoir of him written with much good taste; and he died, after a short illness, July 6, 1836, leaving behind him the character of a pious good man, and an indefatigable searcher for truth.

CROCHET, WILLIAM, Doctor of Music, was born in 1770, in the city of Norwich. While yet a child, he exhibited facility in music, and was at once perceived to be a boy of quite marvellous, and rival those of Mozart. An account of his precocious talents was given by Dr. Burney, author of the 'History of Music,' and is printed in the 'Philosophical Transactions' for 1778, when the infant prodigy was only four years old. He was educated at the University of London, and was appointed Professor of Music in the University of Oxford, and the university also conferred on him the degree of Doctor of Music. In 1824 he was appointed Principal of the Royal Academy of Music. He performed in public for the last time in 1834 in Westminster Abbey, during the royal festival, when he presided at the organ on the third day. Dr. Crochet composed a very large number of works, as organist of St. Paul's and composer of the 'Palestrina,' and some pleasing vocal pieces, among which may be mentioned the 'five odes for five voices, 'Mona on Snowdon calls.' He also published 'Elements of Musical Composition and Thorough-Bass,' 1816, and 'Specimens of various styles of Musical Allegro and Variations.'

Dr. Crochet, during the latter years of his life, resided at Banbridge, Antrim, with his son, the Rev. W. R. Crochet, master of the free grammar-school. He died December 29, 1846, and was buried in his parish church, where the mourners were numerous.

CROZIER, CAPTAIN FRANCIS RAWDON MOIRA, second in command of the ill-fated Franklin expedition, was born at Banbridge, county Down, Ireland. He entered the navy in June 1810, and, under the command of Sir Thomas Stewart, sailed from England on the 24th of July for Pico's Island, which was found peopled by the descendants of the mutineers of the Bounty. In 1824 he was appointed master-of-the-ferry, and he accompanied Fawcett in three of his voyages to the Polar Sea. In 1829 Mr. Crozier was made lieutenant, and was employed on the coasts of Spain and Portugal till December 1836, when he sailed with Captain (now Sir) James Ross, to search for the missing whalers in Baffin's Bay. His reputation for perseverance, which he had gained in the exploration of Antarctica, was secured by the death of his principal and the promotion of the Terror in the expedition under Sir J. Ross for the exploration of the antarctic regions, which sailed in 1839, and was absent three years. In March 1845 he was re-commissioned to the Terror, and sailed with Franklin to discover the North-West Passage ; since which time he has not been heard of. He was in the prime of life on his departure, and died probably in his fifty-third year. He was a Fellow of the Royal and Astronomical Societies; a man of great merit, was distinguished by great devotion to duty as for love of science.

CRUDEN, ALEXANDER, the author of the well-known Concordance, was born at Aberdeen in 1701. He studied at Marischal College, but whilst there, his conduct was marked by an idea of doing what was wrong and he was turned out of the university four years later, and, as it was found necessary to abandon his intention of becoming a minister of the Church, he came to London in April 1724, and subsisted by giving lessons in Greek and Latin. Afterwards he obtained a situation as tutor, and in that capacity resided for some time in the Isle of Man. In 1729 he opened a bookseller's shop under the Royal Exchange, and occupied his leisure hours in the preparation of his 'Concordance of the Old and New Testament,' which appeared in 1737. It was dedicated to Queen Caroline, and Cruden had calculated sanguinely on her majesty's favour. The queen died however just after the publication of his book, and the disappointment brought out the fact that it was rankly plagiarised from the well-known 'Concordance to the New Testament' of a Mr. Asbury at Basinghall-street, where he was confined from March 23 to May 21, 1738, when he escaped. He persisted in asserting that he was of sound mind, and brought an action against the keeper of the asylum and others; but as might be supposed he was not directed by the judge to find a verdict for the defendant.

Crudens published an appeal to the public, under the title of 'Mr. Crudesley greatly Injured on account of a Trial between Mr. Alexander Crudens, bookseller, and an account, plaintiff, and Mr. Congre, Matthew Wright, John Oswald, and John Davis, defendants, in the Court of Common Pleas, in Westminster Hall, July 17, 1738, on an action of Trespass, Assault, and Impeachment... with an account of several other Persons, who have been unjustly confined in Private Madhouses.' The whole tending to show the most necessary there is for the Legislature to regulate Private Madhouses in a more effectual manner than at present, 5vo, 1739.Crudens, who appears to have been treated while in the asylum, by the furious reader of printers' proofsheets, and in the occasional preparation of indexes. Among others he is said to have compiled the elaborate index to Newton's 'Milton.'

He now entered on that part of a strange kind of autobiography, under the title of 'Adventures of Alexander the Corrector.' A second time it was deemed necessary to place him under temporary restraint at Chelsea; and again he brought an action in the Court of King's Bench for an injunction. He took part in the proceedings against the parties who had him confined, with as little success as before. On obtaining his liberty he became again a bookseller, and returned to his ordinary occupations. Subsequently he published the second part of his Adventures, in which he gave the history of his second confinement, or 'Chelsea Campaign,' of which he says, in his preface, 'itLad been a part of his work, as an honest and moderate man, to bring the public into possession of the results of his experience, in which he had lived; to give to the world the story of his own life, and thus to persuade others not to proceed on the same line of action.'

Three editions of it were published during the lifetime of the author. It continued to print for many years, and it has since gone through innumerable editions of all degrees of correctness: one of the most esteemed is that of 1810.

CUBITT, THOMAS, was born in 1788, and was the son of a labouring man at Buxton, a village in Norfolk. Thrown
CUC 164 CUM

easily on his own resources, and denied the advantages of what is called a liberal education, he nevertheless rose into eminence by skill and industry combined with integrity, and amassed a fortune by the judicious management of his estates. He died in 1645, and his son, Robert, continued the work of his father. He was a man of great energy and achievement, and is said to have spent large sums in the establishment of new industries and the improvement of existing ones.

Coniston. Coniston is a small market town and parish in the county of Cumbria, England. It is situated at the head of Lake Windermere, and is noted for its beauty and its many lakes and mountains. The town has a population of about 5,000, and is surrounded by rich agricultural land.

Cumbrian Rocks. The Cumbrian Rocks are a group of rocks that occur in the north of England, in the counties of Cumbria and Lancashire. They are composed of various types of sedimentary rocks, including sandstone, shale, and limestone, and are mainly of Carboniferous age. The rocks are important for their fossil content, particularly for the Silurian and Devonian periods.

CUMMINS. Alexander Cummins was a British geologist and paleontologist who worked in the late 19th and early 20th centuries. He is known for his work on the geology of the Scottish Highlands, and for his contributions to the study of the Silurian System. His most important work was on the Cumbernauld Limestone, which he described in detail in his 1900 monograph, "The Silurian System of Cumbernauld."
certainly is merely as to the name by which certain portions of them shall be called.

CUMMINGTONITE, S. 2.

CUMMINGTONITE, an American mineral belonging to the hornblende series. It is fibrous, of an ash-grey colour, with a slight silky lustre. It is found at Cummington and Plainfield, in Massachusetts. (Dana, Mineralogy.)

CUMNITA, a genus of plants belonging to the natural order Labiatae.

It has a 13-celled calyx, ovate, tubular, equal, 5-toothed, the throat villous inside. The corolla having the tube equaling the calyx, naked inside, and the limb bluish or white, in five-series, is nearly tube-shaped; lower lip spreading, trid, with nearly equal entire lobes, the middle lobe rather the largest and emarginate. The stamens 2, erect, excluded, without any rudiments of the upper two; filaments glabrous, toothless; anthers 2-celled, cells parallel, or at length divergent.

A. styloides, native of Carolina, on dry mountains, is a branched herb with short glabrous branches, but pubescent at the nodes. The corolla is about twice as long as the calyx, and is pubescent inside, and of a red colour. It is employed medicinally, where it grows, in slight colds and fever. Its epidermis and anthocyanin pigment are both valuable.

C. microsphala is also used medicinally in coughs and colds, in Brazil, where it grows. It has a procumbent stem, with scarcely pubescent branches; the leaves peltate, oblong, or obovate, obtuse, quite entire, or subsparsely serrate, with a short acuminate point, and flab. The corolla is white; the throat villous inside.

There are several species of this genus, none of which are of any known use except those above mentioned.

CUPANGUS. (Parisitaceae.)

CUPULE, a kind of cup or involucry surrounding certain kinds of fruit, and composed of bracts more or less grown together. In the oak the cup of the acorn is the cupule; in the hazel-nut it is the husk; in the beech and chestnut the prick, in the filbert the covering, and in the lobed bract.

CURASSOW. (Cracidae.)

CURRAN, JOHN PHILPOT, was born on July 24, 1760, at Newmarket, in the county of Cork, Ireland. His parents were respectable, but not wealthy; his father having been an officer to a municipal court, and possessing the advantages of a classical education. His mother, perceiving early indications of talent, was in hopes of his becoming a clergyman, and efforts were accordingly made to procure him a suitable education. He was first procured some instruction from the Rev. Nathaniel Boyce, the resident clergyman, with whom he maintained a continued friendship. He was next sent to the Free Grammar-School at Middleton, and afterwards entered as a sirar in Trinity College, Dublin. After the utmost love and attention to learning, and entering at that university, he abandoned his first intention of entering the church, and determined to adopt the profession of the law. Accordingly, having passed through the university with great credit, he went to London, and entered himself at the Middle Temple in 1773. Here he straitened means occasioned him some inconveniences, but he studied law with considerable assiduity, and practised oratory at some debating societies, where he is said to have displayed his talent for energetic and socratic speaking. In one of the vacations, between the terms, he returned to Ireland, and married a daughter of Dr. Creagh in 1774. With her he received a small portion, which somewhat smoothed the remainder of his term of probation, and, in 1776, he was called to the Irish bar. His success was almost immediate. His style was precisely suited to the Irish courts: humourous, discursive, often flowery and poetical, vehemently appealing to the feelings, never wearying by dry legal arguments, but which, by their vehemence, dryness by occasion, and wit or satirical illustrations, and he soon obtained a leading business. His social habits also operated in his favour, and though he had already adopted a political belief in opposition to the reigning government, he was a general favourite everywhere, and was not attacked by any bearing to the judges won him the favour of the public. The fearlessness of his addresses however sometimes brought its inconveniences. As counsel in an action for assault by the Marquise of Donegall on a poor old Roman Catholic clergyman, he had styled Mr. St. Leger, one of the witnesses for the defence, “a renegade soldier, a drummed-out dragon;” a duel followed, when he declined returning Mr. St. Leger’s fire, and the affair ended. He had been always a warm political man, and it is said that he was always present as member for Kilbeggan, on the interest of Mr. Longfield. As a spec- men of the state of the Irish parliament, we may mention that soon after entering the House of Commons he found himself differing in political opinions with his patron, and as he had no way of procuring the return of his seat, he was offered another seat, to be filled by any one Mr. Longfield might choose to appoint. That gentleman declined the offer; but in the succeeding parliament Mr. Curran bought a seat for himself. In 1772 he was appointed assessor to the court of taxes, and generally acting with Mr. Grattan and the few liberal members who then had seats. His speeches were of a very similar character to those he made at the bar, and he was often appointed to make the reply from his readiness and happy facility in retorting charges or damaging the positions of his opponents. He supported the formation of the Irish Volunteers in 1778, and the unconditional appoin- ment of the Prince of Wales to the regency on the occasion of the king’s illness in 1779, and took a seat on the government led to a duel, first with Mr. Fitzgibbon, afterwards Earl of Clare, and then with Major Hobart, in which Mr. Curran was the challenger, in both of which neither party was injured. It was in 1774 and the few subsequent years that Mr. Curran’s name was foremost in the Irish question, and as his fame spread to the United States, he was appointed a volunteer to the Irish House of Commons before the introduction of the meas- ure for the Union, of which he strongly disapproved, and which he ever continued to lament. The assassination of 1803 brought trouble into his family; Robert Emmet, one of his leaders had formed an attack on Miss Curran, which was returned; and his correspondence with her, with his visits, sometimes secretly, to her father’s house, led to a suspicion of Mr. Curran’s loyalty, and to the searching of his house, and conviction of himself, for Mr. Curran, Mr. Grattan, and others, had been continually pointing out to the government that their measures were driving the people towards rebellion. The warnings were unheeded, and in 1784 Mr. Hamilton Rowan was indicted himself, and the two brothers, Sheares, Theobold Wolfe Tone, and Matthew Curran. He had retired to the Irish House of Commons, and the Irish House of Commons was abolished by the act of 1800, which afterwards took this name, of which he was secretary. Mr. Curran was his counsel, and made an eloquent and vigorous defence, but Mr. Rowan was convicted and sentenced to transportation, and after the breaking out of the rebellion in 1798 he was the counsel generally employed by the accused, among whom the most remarkable were the two brothers Sheares, Theobold Wolfe Tone, and Matthew Curran. He had retired to the Irish House of Commons before the introduction of the mea- sure for the Union, of which he strongly disapproved, and which he ever continued to lament. Mr. Emmet had named him one of his counsel, but he did not act. Mr. Emmet was convicted and executed; his fate and his sufferings has been the subject of ‘Two Men of Moreau’s Irish Melodies.’ Upon the death of Mr. Pitt, in 1806, the Whig ministry under Lord Grenville created Curran Master of the Rolls in Ireland. This appointment did not give him satis- faction; it withdrew him from politics, and as his mind was not judicial, he felt himself out of place: he thought he had been neglected, and his health declined. He held the office till the early part of 1813, when he resigned; and he died in London on October 14, 1817. Mr. Curran in the course of his life wrote a considerable number of verses above ordinary merit, but which bears no comparison with his eloquent speeches.

CURSITOR BARON. This office, or rather sinecure, was abolished by the statute 19 & 20 Vict. c. 86, which also makes provision for the performance of its almost nominal duties.

CUSHAT (Colymbus diophius). (COLUMBIDÆ.)

CYAMELIIDE. [CHEMISTRY, s. 3.]

CYANOGEN, CHLORIDE OF. [CHEMISTRY, s. 1.]

CYANUS, a genus of plants belonging to the family Camellietoidea.

CYCLADIZO, a family of Lamellibranchiato mollusks. It is a group of fresh-water mollusks, whose shells resemble those of Kuliia or of Astarea, but whose soft parts present structures conspicuously distinguishing them from the tribes to which those shells belong. The shells are more or less tumid, equilateral or inequi- lateral, thin, as in our British forms, or thick, as in the foreign Cyrena; smooth or concentrically striated and furrowed, and covered with an epidermis, The hinge is furnished with cardinal and lateral teeth, and the ligament is external.
The animals have plain-edged mantles open in front, siphonal tubes produced, and either partially separated or completely united to their unfringed extremities, and a large linguiform foot. They live buried in the mud of slow streams, lakes, ponds, ditches, and springs. Our native species are all ovo-viviparous. They breed readily in confinement, and often exhibit considerable activity, ascending the sides of the vessel in which they are placed. (Forbes and Hanley.) This family contains two British genera, Cyclos and Punticium. Cyclos has the shell equivalent, thin, sub-ovoidal, smooth or concentrically striated; the large, oblong, inhabits the oblong, centrically united tabes of the area, and the oblique, a prominent, usually inflated, and slightly insular. C. ricosta has the shell oval, globose, striated; umbones obtuse; dorsal area with a small lunular impression; ligament manifest.

The ordinary length of the finer specimens is 104 lines, and its breadth about two-thirds of an inch.

The tubes of the animal are tinged with rose or tawny, and when fully protruded are nearly equal, the branchial, if either, being longest.

The foot is large, white, and ligniform; the mantle white; the labial palps long, triangular, and strongly striated. It is sinuous in its habits.

Forbes and Hanley give the following localities:—The most prominent is the river Thames; it is found likewise in the New River (Raij); the Treat (Jenyns); the Lea (S. H.); the canals about Leamington, in Warwickshire (Thompson); streams in Yorkshire (Baird). In a pond at Enville, Staffordshire, a young specimen (Jeffrey). It has not been taken either in the Thames, or the Dee, or the Severn, or the Thames, or the Dee, or the Severn, or the Thames, or the Dee, or the Severn, or the Thames, or the Dee, or the Severn.

In Germany, France, and Belgium; and as a fossil is found in the Pleistocene Fresh-Water Beds of the south of England.

C. corvis, Linn. Shell sub-ovoidal, almost smooth; umbones obtuse; ligament inconspicuous. There is a sub-ovoid variety (apparently the Stagmosa of Mr. Heppard), which is flattened towards the ventral margin, and has the pedicellum and swollen umbones peculiarly prominent. The dimensions of the larger typical form are six lines and a quarter in length, and five lines in breadth; of the variety five lines and a half in length, and four and three-quarters in breadth.

The animal is white, its sub-elongated siphonal tubes tinted with pale flesh-colour. Mr. Jenyns observes that the superior tube is sub-ovoidal, with a small aperture, the inferior cylindrical and truncate, with a wider aperture.

This very common species is a general inhabitant of rivers, ponds, and ditches throughout the country. It appears to thrive equally well both in running and in stagnant water. (Jeffrey.)

It is also generally distributed throughout Europe, and occurs fossil in fresh-water strata of the pleistocene age in the valley of the Thames.

C. cictolenta has the shell more or less rhomboidal; umbones narrow, more or less prominent, capped.

This species is apparently less frequent in the north than in the more southern parts of England. Mr. Alder has found it near Newcastle; Mr. Bean at Scarborough (where it is not scarce); Mr. Thompson at Lichfield; and Captain Brown records the vicinity of Manchester and the lakes of Westmorland for its localities. Montagu met with it in Devonshire and Wiltshire; Mr. Jenyns at Bookham Common in Surrey; and more sparingly in Cambridgeshire; and Mr. H. Strickland at Hornea in Yorkshire. Mr. Jeffreys has taken it in the Clumber Lake, Nottinghamshire, and in the neighborhood of Bristol. In Ireland it is also rare. "On the Continent it occurs in Sweden, Germany, Belgium, Holland, and Italy. The C. portentosa of Sax, in depth of the ventricosity of the adult, is very closely allied, especially in outline, to this species, and may be regarded as its transatlantic representative." (Forbes and Hanley.)

Punticium has the shell equivalent, thin, usually sub-ovoidal, inequilaterial, smooth or concentrically striated; bings with one tooth in the right and usually two in the left valve; also lateral teeth; ligament external, inserted at the shorter side.

The species are very small bivalves, living in similar localities with Cyclos, and not uncommon even in ditches through meadows.

P. punticium. Shell rounded, oval, not greatly inequilateral; valves not slightly striated; valves not swollen, always a little compressed below; umbones usually broad, and but little projecting. This is by far the commonest of the small Punticium in this country. It is found abundantly in ponds and ditches. It inhabits generally northern and central England.

P. pulchellum. Shell small, striated (not grooved); umbones simple and without appendages. There are many varieties of this shell. It has a great tendency to assume a multiplicity of forms. The average size is a line and a half long, and a line and a quarter broad. It is very common in many parts of Great Britain.

The other British species of this genus are P. Hericole,
P. ricota, P. punctatum, and P. decusatum.

C. CYTHERIES. *C. Cristata*, a small, elongated order of Exogenous Plants. The order consists of shrubs with evergreen simples leaves without stipules. The flowers usually in racemes. The calyx 4-5- parted. It has 5 distinct petals, with an imbricated modification. The ovary is 3-4-celled, always chorisomatous. It is composed of some number of carpels different from that of the calyx, corolla, and stamens; solitary pendulous ovules, a short style, the stigma with as many lobes as there are cells of the ovary. The fruit is a succulent capsule or a drupe; the seeds inverted; the leafy in the axis of a very large angular, or rounded, or in some cases, with a very long stalk. This order is related to Olacaceae and Pitsocarpaceae. All the species are inhabitants of North America. Nothing has been recorded of any ease to which they are applied.

C. CYTHERES, a genus of entomostracous crustaceans, belonging to the legation Leptopodops, the order Ostroiscidae, and the family Cythrididae. The species are few very commonly in Great Britain. [Branchiopoda.] Mr. Rupert Jones, in his "Monograph of the Entomostraca of the Cretaceous Formation of England," describes the five fossil species belonging to this genus. [Entomostraca.] The same author describes ten species of this genus as fossil in the Permian Rocks of England.

C. CYTHERES is a genus separated from the group of species known as C. cytheres by Mr. J. Jones. It has the following characters:—The animal is unknown. Carapace-valves or shell of an almost regular oblong shape, the dorsal and ventral margins lying nearly parallel to each other. Surface of a very irregular appearance, being wrinkled, ridged, and beset with tubercles, or excavated or strongly toothed on the margins.

Dr. Baird has described three recent species, whilst two fossil forms have been described by Mr. Jones from the chalk. *Bairditia* is a group of species formerly referred to Cytheres, and separated by M'Coy. The valves externally are convex and smooth, sometimes flat, pitted or spined, never ribbed or granulated; the hinge is simple.

This genus has no recent species. Six species have been found in the chalk.

C. CYTHERES is a genus separated by Jones from Cytheres. It embraces species of Cytherina of other authors. The carapace valves are oblong, and vary in the convexity and smoothness of the surface; the right valve is larger than the left, and its contact margin thicker than that of the opposite valve. Six fossil species have been described from the chalk.

DAGRIDIUM, a genus of Gymnocalyciaceous Plants belonging to the natural order Tertiary. One of the species, D. far- 
folium, the Kakaterra-Tree of New Zealand, acquires a 
height of 200 feet. From its branches may be manufactured a 
beverage resembling in antiseptic qualities the well-
known spruce-beer.

DAGUERRE, S. JACQUES MANDE, was born in 1780 at Cormeilles in the department of Seine-et-Oise, France. 

At the outset of his life he obtained a situation in a government 
office, but he early quitted that employment, and became a 
peep of M. Dagoty, scene-painter at the opera. As a scene-
painter, Daguerre in a few years surpassed his instructor, 
and placed himself on a level with the first professors of that 
art in Paris, while he quickly extended the capabilities of the 
art by various ingenious contrivances, which he invented 
for producing increased pictorial effect. He also assisted 
M. Prevost in the preparation of his panoramic views of the 
great cities of the world. The experiment he thus acquired 
suggested to M. Daguerre the idea of producing a scene 
exhibition, in which the illusion should be more 
perfect than in the panoramas, and he invented, in conjunc-
tion with Bouton, a method of so throwing coloured lights 
and shadows upon the view, as to produce the appearance of 
changes of season, day and night, storm and sunshine, etc.

This mode public demonstration of the effects of Daguerre's 
new process, was received with equal success in Paris and 
in a circular structure erected for the purposes in Paris, the 
success was complete. The diorama in fact made what the 
Parisians term a sensation, and no long time elapsed before 
M. Bouton and Daguerre erected a similar building in 
London, to which each picture was removed, when it had 
been exhibited for its season in Paris. For some seventeen 
years pictures followed picture, each rivalling its predecessor, 
but in 1839 a fire destroyed the building, and the view then 
exhibiting in it was destroyed, and the building itself was not 
re-erected, as the public interest in dioramas, which had now 
lost their novelty, was beginning to flag.

M. Daguerre had before this been directing his attention 
to a matter which was destined to secure for him a more 
permanent reputation than his scenery or his dioramas. This 
was the mechanical production of fac-simile delineations 
of objects by the chemical action of light. As early as 
about the middle of the 16th century, Fabricius had dis-
covered the property which salts of silver possess of changing 
colour, and it is said that the father of Daguerre had 
been the subject of many experiments by scientific men. 
Sir Humphry Davy, among recent chemists, has sought by 
various applications of this property to obtain copies of 
simple objects by the action of light; but his was unable to 
prevent them from being effaced when exposed to the 
light. In France M. Niepce began about 1814 to pursue a 
similar course of experiments, and he succeeded in 
rendering the images he obtained insensible to the subse-
quent action of the light; but his discovery remained very 
incomplete when Daguerre commenced similar experiments. 
About 1829 Niepce and Daguerre joined in the prosecution 
of their investigations. Niepce died in 1833, before they 
had made any decided approach to success. But Daguerre 
persuaded, and at length his zeal and rare ingenuity met 
with an ample reward. He discovered in fact a method by 
which he was able so to prepare metallic plates, that by 
placing them in the darkened chamber of a camera-obscura, 
they received a distinct impression of the images thrown 
upon them by the lens of the camera, which he was enabled 
by a subsequent process to render indelible. Some account 
of the steps by which he arrived at this grand discovery, 
the method adopted for producing, rendering visible, and fixing this 
sun-drawn picture, has been recently published in a work 
titled "PRACTICAL PHOTOGRAPHY," S. 1.

It will be enough to say that with re-
markable patience and ingenuity he surmounted every dif-
culty, and eventually produced his discovery, as to its prin-
ciples, perfect. Other experimentalists had in this country and 
elsewhere been at work, unknown to Daguerre, at the same 
time; but to M. Daguerre is due the priority of publication 
of the discovery, and no doubt also the priority of discovery, 
as far as the producing sun-pictures upon metallic plates is 
concerned. What has proved to be the more generally 
applicable process of photography, was as unquestionably the 
result of the independent investigations of our own compa-

DALBERGIA, a genus of Plants belonging to the natural 
order Fabaeae, named in honour of Nicholas Dalberg, a 
Swedish botanist. It has a reputation for yielding a 
papilionaceous corolla, the petals of the keel connected to the 
 apex; 8-10 stamens, sometimes all monadelphous, with the 
tube or sheath cleft in front, sometimes divided into 
equal opposite segments, and in others one side longer 
than the other; a stipitate membraneous complanate kegule, 
the lower orifice of which is called) the flower; 20-30 
seeds, which vary from 1 to 3, are compressed and remote. 
The species are sometimes trees, but usually climbing shrubs, 
with impari-pinnate leaves.

D. aranzé, another of the species, yields a resin very 
similar to Dragon's Blood.

There are about 22 species of this genus, none of which 
are of any known use except those mentioned.

DALKICHT, Edinburghshire, Scotland, a market-town 
and burgh of barony in the parish of Dalkeith, six miles 
S.E. from Edinburgh by road, and eight miles by the 
Edinburgh and Hawick railways. The population of the town 
was 5068 in 1861. The affairs of the haurgh are adminis-
tered by 15 trustees. The town stands on an elevated piece 
of ground, between the rivers North Esk and South Esk, 
and consists of one central thoroughfare, and several small 
streets. The town is clean and generally well built, it is 
lighted with gas, and well supplied with water. Felt and 
beaver hats, straw hats, and woollen stuffs are manufactured, 
and there are corn-mills, a brewery, and a tan-work. The 
market is once a week. It is the capital of Midlothian, 
Scotland. The parish church is an old Gothic building in the 
principal street. Attached to it is an ancient chapel 
containing the recumbent statues of an Earl of Morton and his 
 lady. Adjoining this church is the mortuary chapel of the 
Buchleech family. A splendid new church of an English 
style of architecture, was built in 1840 by the 
Duke of Buccleuch. It is cruciform, and has a steeple 167 
feet high. An elegant episcopal chapel is situated within 
the grounds of Dalkeith palace. The Free Church, United
Presbyterians, and Independents, have places of worship. In the town are two libraries and a savings bank. Dalkeith possesses an extensive park, and a view of the town is an extensive structure, surrounded by a splendid park and grounds. The mansion contains many fine paintings. The North Esk and South Esk unite their waters in the park, a little way beyond the palace, which is situated on an elevated peninsula, formed by the confluence of the two streams. It belonged to the Grahams in the reign of David II. It afterwards passed into the hands of the Earls of Morton, and about two centuries ago was purchased by an ancestor of the Buccleuch family. Charles Edward spent two nights at Dalkeith after the battle of Preston Pans, and the palace has been visited by George IV. and Queen Victoria.

DALRYMPLE, JOHN, was born in the year 1804 at Norwich, where his father was a surgeon in general practice. He was educated for the medical profession under his father in Edinburgh and London. He commenced practice as a surgeon in London in 1827. During the latter part of his career he devoted himself entirely to oculary surgery. He died in 1852. As a surgeon-oculist he was better known for his work on the 'Anatomy of the Human Eye,' which was published in 1854. He was not however known only as a surgeon, but also as a naturalist and accurate microscopic observer. Amongst his papers on these subjects the following are the most important: 'The Structure and Function of the Fish-eye of the Bull-fish' published in the 'Magazine of Natural History,' sect. 2, vol. ii.; 'On the Vascular Arrangement of the Capillary Vessels of the Allantoid and Vitelline Membranes in the Incubated Egg' ('Transactions of the Microscopical Society,' vol. i.); 'On the Invertebrates of the Family Clitellata' ('Annals of Natural History,' vol. v.). In 1849 he read a paper before the Royal Society on a hitherto undescribed infusory animalcule allied to the genus Notornasus of Ehrenberg. This paper was interesting as confirming the discovery of the sexuality of the infusorians, which had been made by Brightwell. This paper was published in the 'Philosophical Transactions,' and in 1850 Mr. Dalrymple was elected a Fellow of the Royal Society.

Mr. Dalrymple was one of the surgeons of the Royal London Hospital. He was a Fellow of the Royal College of Surgeons of England, and in 1851 was elected a member of the council of that body.

DAMAGE. The stat. 1 Geo. IV. c. 87, enabling a landlord to recover damages in the action of ejectment by which he recovers possession, although not repealed, is superseded by provisions to the same effect in the 'Common Law Procedure Act,' 1852.

DAMAN. [DAMAR.] D. MACFADYEN, in Procr. 'On the Natural Order of Plants related to the Farn.' They have all the habit of Dorsiferous Farns, but their spore-cases are ringless and combined in masses, splitting irregularly by a central cleft. The species are all tropical. It embraces the following genera:—

- Kaulliaustus, Anderabellus, Diploloma, Calonectes, etc.

D. ramosa also has a native of the forests of Brazil, and has a twining stem with hairy twigs. The leaves are oblong, remotely and obsolescent, serrated, rough and hairs above, almost or entirely smooth on the under side. The racemes are hairy and hairciliate; the sepals silky. The petals from 1 to 6, somewhat obcordate. The stamens 4, the anther dehiscent, and furnish the valuable called Sambalbusia in East Indies.

D. rubra also has a native of the forests of Brazil, and has a twining stem with hairy twigs. The leaves are oblong, remotely and obsolescent, serrated, rough and hairs above, almost or entirely smooth on the under side. The racemes are hairy and hairciliate; the sepals silky. The petals from 1 to 6, somewhat obcordate. The stamens 4, the anther dehiscent, and furnish the valuable called Sambalbusia in East Indies.
within two days of his death he performed the active duties of his responsible position. He died on the 11th of April 1855.

The distinguishing feature of Sir Henry's mind was its eminently practical character. The establishment of the Geological Survey and the School of Mines was a proof of this. Wherever his knowledge could be made available for practical purposes, his services were at the command of the public. His mind was so broad and his spirit so adapted to the important work of a Towns Commission and also of the Commission of Sewers. He was chairman of one of the juries of the Great Exhibition in 1851. With Sir Charles Barry he formed one of the committee to select building-stone for the New Houses of Parliament. He was entirely successful in having the decision of reporting to the government on the coals suited to the steamery, also with Dr. Playfair and Mr. Smyth in reporting on the gases and explosions in collieries. He was elected a Fellow of the Royal Society in 1819, in 1846 he had conferred on him the honour of knighthood, and in 1848 he was elected a corresponding member of the Academy of Sciences of Paris.

DEBENHAM. (Surprize.)

DEBT. ACTION OF. The peculiarities connected with this action, which led to the use in ordinary cases of the action of assumpsit, have for all practical purposes ceased to exist. Wager of law having been abolished, and the pleadings in personal actions greatly simplified, nothing remains to distinguish the law of mind, and it is only by a specimen so called, from any other action for breach of contract. (Blackst. 2d Comm., Mr. Kerr's ed., vol. viii. p. 162.)

DEDDINGTON. [Oxfordshire.]

DE DICTION. The jurisdiction of the Ecclesiastical Courts, or, as Blackstone says, of a "petty surrogate in the country" to punish "for railing or contumelious words "pro solute anime," by means of the "brutum fulmen of ecclesiastical process," having long been a subject of considerable ridicule, though frequently of grievous opposition to the poor, has at last been abolished by the statute 18 & 19 Vict. c. 41.

DELA ROCHE, PAUL, an eminent French painter, was born at Paris in 1797. Early intending to follow a civil profession, he at first studied landscape, and was in 1817 an unsuccessful candidate for the Academy prize in landscape painting. Convinced that landscape-painting was not his vocation, he entered the atelier of Baron Gros, under whose guidance he made rapid progress in the study of the figure. Gros had himself in a great measure thrown off the classic trammels which his master David had fixed on French art, and Delacroix entirely emancipated himself from their thraldom. But Gros still adhered to the old laws, and many of the conventionalities of art. Choosing this subjects to a great extent from modern history, and painting without much regard to academic attitudes and arrangements, he yet sought to maintain a certain dignity in his work. Delaroche was a forerunner in French art of the modern school of historians and archivists. He was far more learned and architectural in his conceptions, and his study of the great masters was at the same time more profound and less artificial. He was still adhered to the old laws, and many of the conventionalities of art. Choosing his subjects to a great extent from modern history, and painting without much regard to academic attitudes and arrangements, he yet sought to maintain a certain dignity in his work. Delaroche was a forerunner in French art of the modern school of historians and archivists. He was far more learned and architectural in his conceptions, and his study of the great masters was at the same time more profound and less artificial.

DELA ROCHE, M. This eminent painter of landscape, in 1839, was voted a pension by the government, an honour he had long desired. It was a higher order of business, Cromwell contemplating the Corsos of Charles I. He has here imagined a circumstance in itself sufficiently probable, and he has blended it with a calm dignity worthy of the theme. M. Delaroche has been often accused of sacrificing his principal subject to the accessories by his excessive care in the rendering of them, but here the attention is at once arrested by the thoughtful head of the Protector, directed to the life-like face of the soldier, the over-wrappers of the victim and the victor. The sombre color and gloomy shades are entirely in unison with the prevalent impression. Simple as is the idea of the picture, it would perhaps be difficult to name another modern painting which so thoroughly conveys a particular mind of the picture. It is in the collection of the Duke of Sutherland. M. Delaroche also painted some illustrations of Scott's novels. Among the subjects from French history may be named "Une Scene de la St. Barthelemy" (1828); "Le Cardinal de Richelieu" and "Le General Moncey" (1835). Delaroche, being editor of "Le Diable Bleu," found a companion picture to "that of Cromwell contem- plating the Corsos of Charles," and equally well known by the engravings, but certainly far less impressive as a work of art, for the technical skill and vigour of his picture. It is in the collection of the Duke of Sutherland. M. Delaroche also painted some illustrations of Scott's novels. Among the subjects from French history may be named "Une Scene de la St. Barthelemy" (1828); "Le Cardinal de Richelieu" and "Le General Moncey" (1835). Delaroche, being editor of "Le Diable Bleu," found a companion picture to "that of Cromwell contemplating the Corsos of Charles," and equally well known by the engravings, but certainly far less impressive as a work of art, for the technical skill and vigour of his picture. It is in the collection of the Duke of Sutherland. M. Delaroche also painted some illustrations of Scott's novels. Among the subjects from French history may be named "Une Scene de la St. Barthelemy" (1828); "Le Cardinal de Richelieu" and "Le General Moncey" (1835). Delaroche, being editor of "Le Diable Bleu," found a companion picture to "that of Cromwell contem- plating the Corsos of Charles," and equally well known by the engravings, but certainly far less impressive as a work of art, for the technical skill and vigour of his picture. It is in the collection of the Duke of Sutherland. M. Delaroche also painted some illustrations of Scott's novels. Among the subjects from French history may be named "Une Scene de la St. Barthelemy" (1828); "Le Cardinal de Richelieu" and "Le General Moncey" (1835). Delaroche, being editor of "Le Diable Bleu," found a companion picture to "that of Cromwell contem- plating the Corsos of Charles," and equally well known by the engravings, but certainly far less impressive as a work of art, for the technical skill and vigour of his picture. It is in the collection of the Duke of Sutherland. M. Delaroche also painted some illustrations of Scott's novels. Among the subjects from French history may be named "Une Scene de la St. Barthelemy" (1828); "Le Cardinal de Richelieu" and "Le General Moncey" (1835). Delaroche, being editor of "Le Diable Bleu," found a companion picture to "that of Cromwell contem- plating the Corsos of Charles," and equally well known by the engravings, but certainly far less impressive as a work of art, for the technical skill and vigour of his picture. It is in the collection of the Duke of Sutherland. M. Delaroche also painted some illustrations of Scott's novels. Among the subjects from French history may be named "Une Scene de la St. Barthelemy" (1828); "Le Cardinal de Richelieu" and "Le General Moncey" (1835). Delaroche, being editor of "Le Diable Bleu," found a companion picture to "that of Cromwell contem-
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Committee of the Privy Council, which consists of the Lord President of the Council, the Lord Chancellor, the Chief Justice, and Chief Baron, the Master of the Rolls, and Lords Justices. The Court of Appeal in Chancery, the Judges of the High Court of Admiralty and of the Court of Probate, and certain other persons nominated by the Crown. In ecclesiastical causes, Bishops who are Privy Councillors are members of the committee. The proceedings of this tribunal, which are always kept secret, and are not laid before the House of Lords, are now published. (3 & 4 Will. IV. c. 41; 6 & 7 Vict. c. 36). The Judicial Committee has authority in various other matters, as to which see Paxton, S. 2; Judicial Committee, S. 2. (Blackstone's Commentaries, ed.)

DENIZEN. Letters of Denization are now dismissed, aliens generally having recourse to the simpler and more advantageous certificate of naturalisation granted by the Secretary of State. (Austin, S. 1.)

DENIZEN is a genus of fishes belonging to the Family Sparidae. It has the following characters:—Body deep, compressed; dorsal fin, single; head large; teeth conical, placed in a single row, four in the front above and below, elongated, and curved inwards, forming hooks; teeth on the branchial arches, but none on the vomer or palatine bones; nose and suborbital space without scales; branchedioctous rays 6. There are several species of this genus.

D. vulgaris, the Four-Toothed Sparus, is regarded as a native of England; and on a single occasion, seems to have taken root in this country, and that by Mr. Donovan in 1805 off Hastings. It is a very common fish in the Mediterranean, and is the Dentex of the Romans. It is remarkable for the great length of the four anterior teeth in each jaw, which, together with a large mouth, enables him to take fishes from 20 to 30 pounds, and measuring 3 feet in length. Mr. Donovan's specimen weighed 16 pounds. "A more voracious fish," says Mr. Donovan, "is scarcely known; and when we consider its ferocious inclination and the strength of its formidable canine teeth, we must be fully sensible of the great ability it possesses in attacking other fishes even of superior size, with advantage. It is asserted, that when taken in the fisherman's nets, it will seize upon the other fishes taken with it, and massacre them dreadfully. Its swift swimming, it has been seen amongst to a considerable size. Willoughby observes that small fishes of this species are rarely taken, and the same circumstance has been mentioned by later writers. During the winter it prefers deep waters, but in the spring or about May it quits this retreat, and approaches the entrance of great rivers, where it deposits its spawn between the crevices of stones and rocks.

"The fisheries for this kind of Sperus are carried on upon an extensive scale in the warmer parts of Europe. In the manufacture of the Levant, the Levantine term of this fish is an object of material consideration, both to the inhabitants generally as a wholesome and palatable food when fresh, and to the mercantile interests of those countries as an article of commerce. They prepare the fish according to an old system, by cutting it in pieces, and packing it in barrels with vinegar and spices, in which state it keeps perfectly well for twelve months."

DENTINE. [Tissues, Organic, S. 1.]

DEODAND. Juries and judges having (as stated in the "Penney Cyclopaedia," vol. viii. p. 411) alike condemned this species of forfeitique, the law has been altered by the statute 9 & 10 Vict. c. 5, and deodands are now entirely abolished. (Miranda, S. 1. and Deodands (in Criminal Cases). The statute 11 & 19 Vict. c. 106 also contemplates with great care the most exact mode in which the depositions of witnesses are to be taken in criminal cases. The statute requires a deposition to be put in writing, to be read over to the witness, and to be signed by him. Unless these formalities are complied with, and the deposition has been taken in public, the accused, and he has had full opportunity of cross-examination, it is not admissible in evidence against him.

DEPOSITIONS (in Equity). Evidence is now taken in Chancery, as in other courts, by an officer of the court examining not by written interrogatories, but orally, in the presence of the parties, the witness being subject to cross-examination and re-examination. This new system, in imitation of that public examination of witnesses pursued in courts of common law, has not, however, prevented a general introduction, under the name of a Deposition, introduced as part of the practice of the Court of Chancery by the statute 15 & 16 Vict. c. 86. (Blackstone's 'Commentaries,' Mr. Kerr's ed., vol. iii. p. 520.)

DEPPING, GEORGE BERNARD, was born at Münster, May 11, 1784. Having completed his educational course, he visited Paris in 1809, when, forming acquaintances there, and observing the facilities which the city afforded for the prosecution of literary studies, he determined to make it his permanent residence. The rest of his life was spent there in the uneventful career of a busy littérateur.

For many years M. Deppping mainly occupied himself in preparing juvenile and popular works chiefly on geographical and zoological subjects, and laying the foundation of a natural history encyclopaedia. His first important original work was one written for a prize offered by the Institute on the 'Expedition Maritime des Normands en France au Dixième Siècle.' For this he was awarded the Prix de l'Institut in 1836. Among his other important works may be named—'Histoire de la Normandie,' 'Histoire de la Normandie,' from the Conqueror to the Incursions of the French with the Normans (1015 to 1040); 'Deodands, S. 1. of the French language. M. Deppping wrote many of these important articles in the "Biographie Universelle," 'L'Art de Vérité, pour tous et pour chacun' (vol. ii. i. iii. of the Collection des Documents Inédits de l'Histoire de France), 1840; (fig. 1835.)

DERMÁTINE. [Mineralogy, S. 1.]

DESIGN, SCHOOL OF. [Science and Art, Department of, S. 2.]

DESIGN, a group of organised beings regarded by some naturalists as Animals and by others as Plants. The botanists who have adopted them into the vegetable kingdom have regarded them as Algae, and allied them to the Dictomaecea. Some however who admit the vegetable characters of Desmidicea deny them to Dillenius, who, in his "De Algae," 1738, and "De Algae," 1784, regards them as Algae. Several writers have been translated into German and Dutch, while several of his juvenile works have been translated into most of the European languages. M. Deppping wrote many of the more important articles in the "Biographie Universelle," 'L'Art de Vérité, pour tous et pour chacun' (1809.)

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formations, and that under certain circumstances these green bodies represent a germ, capsule, or sporangium, in which, by a process of division, various young *Closteria* come to be produced. The union of the cells of *Didymoparm Borri* is seen in fig. 1.

The process above described appears to be one entirely confined to the vegetable kingdom, as it has never been observed amongst unicellular organisms, which are regarded as exclusively animal.

The process of swarming is one which, although a few years ago its distinguishing feature would have been regarded as entitling the organism exhibiting it to a place in the animal kingdom, and hence the English naturalists regarded purely vegetable. It has been observed in many species of *Confervarum*, more especially in *Achlya prolifera* and *Conferva area*. The following is Mr. Agardh's account of this curious phenomenon in the latter plant. After describing the green matter in the joints, he says—"The granules of which it is composed detach themselves from the mass one after another, and having thus become free they move about in the vacant space of the joint with an extreme rapidity. At the same time the exterior membrane of the joint is observed to swell in one point till it there forms a little lamella, which is to become the point from which the moving granules finally issue. By the extension of the membrane for the formation of the lamella, the tender flaps of which it is, it is composed separating, cause an opening at the end of the joint, through which the granules escape. At first they lie in a body, but soon those remain, swimming in a much larger space, have much more difficulty in escaping; and it is only after impenetrable knockings (littibations) against the walls of their prison that they succeed in finding an exit. From the first instant of the motion, one observes that the granules or sporules are furnished with a little head, a kind of anterior process always distinguishable from the body of the sporule by its paler colour. It is on the vibrations of this head that the motion, as I conceive, depends; at least I have never been able to discover any cilia. However I will not venture to deny the existence of these; for with a very high power of a compound microscope one sees the granules surrounded with a hyaline border, as we find among the ciliate *Infusoria* on applying a glass of insufficient power. The sporules during their motion always present this head in front of their body, as if it served to show them the way; but when they cease to move, by bending it back along the side of their body, they resume the spherical form, so that before and after the motion one sees no trace of this head. The motion of the sporules before their exit from this point consists principally in quick dartings along the walls of the articulation, knocking themselves against them by innumerable shocks; and in some cases we are almost forced to believe that it is by this motion of the sporules that the lamella is formed. Escaping from their prison, they continue their motion for one or two hours; and retarding always towards the darker edge of the vessel, sometimes they prolong their wandering courses, sometimes they remain in the same place, causing their head to vibrate in rapid circles. Finally they collect in dense masses, containing innumerable grains, and attach themselves to some extraneous body at the bottom or on the surface of the water, where they hasten to develop filaments like those of the mother plant." This process, to which the name swarming has been given, has been observed by Mr. Raîsâ, Dr. Hassall, and others in various species of *Domesticum*, more especially in *Spherosps crista* and *Draparnaulia tensis*. No similar movements to these have been anywhere observed amongst the ova of the animal kingdom.

The presence of starch in the *Domesticum* is a third point raised on by Mr. Raîsâ as distinguishing the vegetable kingdom. The existence of this substance is easily ascertained by the well-known reaction of iodine upon it. Meyen first discovered this substance in the *Algae*, and Mr. Raîsâ and others have confirmed his observations. At the same time it should be stated that starch, although not found present in the tissues of the lower animals, has recently been detected in the brain of man by Mr. Brâk ('Microscope Journal', vol. ii. p. 103). This may lead to the discovery of the presence of this carbohydrate not only in the animal kingdom than has been hitherto supposed.

The following reasons are given by Mr. Dalrymple, after giving an account of the structure of *Closteria*, for placing the species of this genus amongst animals:—

1st. That while *Closterium* has a circulation of molecules greatly resembling that of plants, it has also a definite organ unknown in the vegetable world; in which the active molecules appear to enjoy an independent motion, and the parieters of which appear capable of contracting upon its contents.

2nd. That the green gelatious body is contained in a membraneous envelope, which, while it is elastic, contracts also upon the action of certain reagents, whose effects cannot be considered purely chemical.

3rd. The comparison of the supposed ova with cytoblasts and cells of plants precludes the possibility of our considering them as the latter, while the appearance of a vitelline nucleus, transparent hat molecular fluid, a chorion, or shell, determines them as animal ova. It was shown to be impossible that these eggs had been deposited in the empty shell by other *Infusoria*, or that they were the produce of some Enterosom.

4th. That while it was impossible to determine whether the vague motions of *Closterium* were voluntary or not, yet, the idea the author had formed of a sectorial apparatus for his classing them with plants.

On these reasons, Mr. Raîsâ remarks, that the peculiar organ—the terminal glochides—of the *Closteria* are as much vegetable as animal. That the throwing off of the contents of the cell through chemical reagents, is as much vegetable as animal. "If fresh water touches *Griffithia sectae*, the joints burst and split out their contents." That the supposed ova contain starch, and are therefore vegetable. That he cannot discover that the orifices at the extremities of some of the *Domesticum* are tubes, or that they possess a sectorial power.

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*Fig. 1.* Didymoparm Borri, with the cells uniting to form the green matter. *Fig. 2.* Microstaria cereata. *Fig. 3.* Eubastia oblonga. *Fig. 4.* Xanthidium orbiculare. *Fig. 5.* The same. *Fig. 6.* Euthamia emarginata. *Fig. 7.* Closterium Lomrole. *Fig. 8.* Pediastrum simplex. *Fig. 9.* Pediastrum Borpurum. *Fig. 10.* Anhydratium foliatum.

The *Domesticum* are all of an herbaceous green color, and from this circumstance are easily discovered amongst the other microscopic beings with which they occur. They are mostly inhabitants of fresh water. Mr. Thwaites records two or three species from brackish water. They are remarkable for the very definite outline which their forms assume, especially in the genera *Microstaria* (fig. 2), *Eubastia* (fig. 3), *Xanthidium* (fig. 4), and *Pediastrum* (figs. 7, 8). Their most obvious characteristic however is their evident division into two valves or segments. The point of union between the two segments is in general very definitely marked. In *Pediastrum* and *Somedaemia* it is less obvious than other genera. It is at this point of union that the cell...
be found in great abundance on the line, which, if kept moist, will allow of the growth and development of these beautiful objects for many months.

The study of this family will undoubtedly repay the naturalist for years to come. Comparatively little is known of the species beyond the confines of Europe. The following is a catalogue of the genera found by Mr. Ralfs in the British Islands:

*Plant an elongated jointed filament. Sporangia orbicular, smooth.*

1. **Didymoprium**—Filament cylindrical. Two species.

2. **Didymoprium**—Filament cylindrical, or sub-cylindrical. Joints with two opposite or dentate projections. (Fig. 1.) Two species.

3. **Didymoprium**—Filament triangular, or quadrangular; joints connected by a thickened border. Two species. Three species.

4. **Didymoprium**—Filament transverse, or plai, with fornina between the joints. One species.

5. **Spharosoma**—Filament plane, margins incised or sinuated; joints with junction-glands. Two species.

Froed simple from complete transverse division, distinctly constricted at the junction of the segments, which are seldom longer than broad; sporangia spinnous or tuberculated, rarely if ever smooth.

6. **Microstegia**—Lobes of the segments incised or bidentate. (Fig. 2.) Thirteen species.

7. **Didymoprium**—Segments sinuated, generally, notched at the end, and with inflated protuberances. (Fig. 3.) Eighteen species.

8. **Comisia**—Segments in front view neither notched nor sinuated; in end view elliptic, circular, or cruciform. Two species.

9. **Xanthidium**—Segments compressed, entire, and spinous. (Figs. 4 and 5.) Six species.

10. **Arthrodema**—Segments compressed, and having only two spines or mucres. Two species.

11. **Staurastrum**—End view angular, radiale, or with elongated processes which are never geminate. Forty species.

12. **Didymoprium**—Segments angular, each angle having two processes, one inferior and parallel with the similar one of the other segment, the other superior and divergent. One species.

Froed simple, from complete transverse division, generally much elongated, never spinous, frequently not constricted at the centre. Sporangia smooth.

13. **Tetramorus**—Froed straight, constricted at the centre, and notched at the ends. Three species.

14. **Penteia**—Froed straight, scarcely constricted at the centre. Eight species.

15. **Cetesia**—Froed straight, much elongated, constricted at the centre. Truncate at the ends. Seven species.

16. **Cletesia**—Froed crescent-shaped or arcuate, not constricted at the centre. (Fig. 6.) Twenty-two species.

17. **Spirontia**—Froed straight, not constricted at the centre; endochrome spirally twisted. Two species.

18. **Anisomorpha**—Cells elongated, entire, fuscicolate. (Fig. 9.) One species. Six species.

Froed composed of few cells, definite in number, and not forming a filament. (Sporangia unknown.)

19. **Pediastrella**—Cells arranged in the form of a flattened star, their outer margin bidentate. (Figs. 7 & 8.) Eleven species.

20. **Scenedesmus**—Cells oblong or fusiform, entire, placed side by side in a single row, but during division into two rows. Six species.

(Ralfs and Jenner, British Desmidieae: Siabold, On Uninastic Plants and Animals, in Mic. Journal, 1853; Maneghini, On the Animal Nuciee of Diatomaceae, translated by Ray Society, 1854; A. Braun, On Rejuvenescence in the Plant, translated by Ray Society, 1854; Lindley, Vegetable Kingdom; Nageli, Gattungen einzelliger Algen physiologisch und systematisch bearbeitet, Zurich, 1848; Cohn, On the Natural History of Protococcus platense, translated by Ray Society, 1854.)
DIATOMACEÆ, OR DIATOMÆ, a group of organised beings which naturalists have placed in the animal and vegetable kingdoms, according as they have regarded their structures as most allied to the one kingdom or the other. These organisms consist of a single cell, and are remarkable for possessing a hard shell or frustule, which is composed of different materials, some of which remain permanent after its organic tissues have perished.

The following is a definition of this group of beings by one of the most recent writers on this subject:—Plant a frustule; connect it with an imperfect cell, and you have a bivalve siliceous epidermis. It exists in its own self, and its increase, by self-division; during which process the cell secretes a more or less siliceous connecting membrane. Reproduction, by conjugation, and the formation of sporangia. (W. Smith.)

The Diatomaceæ are endowed with the power of motion; and when this function was supposed to be peculiar to the animal kingdom, it is not to be wondered at that the first observers of these organisms referred them to the animal kingdom. Ehrenberg, in his great work on the Infusoria, Animalcules, and Corroborative of our knowledge of this family, has added to the forms that were already known. He regarded them, as well as the Desmidiceæ, and other beings which are now generally referred to the vegetable kingdom, as animals. The following are the principal points on which he relied for assigning to them this position:—

1st. The Diatomaceæ exhibit a peculiar spontaneous movement, which is produced by certain locomotive organs.

2nd. A large number of them have in the middle of the latest lamella, which is known as the valve of the frustule, a diatom which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile Organ, which is known as the valve of the frustule, and which is composed of the Motile O
spread themselves along the membrane which is embraced by the new valves, and there result two half-new frustules bound together by the connecting membrane, generated during the process we have described.

"During the healthy life of the Diatom the process of self-division is being continually repeated; the two half-new frustules at once proceed to divide again each into two frustules, and thus the process continues. I have been unable to ascertain the time occupied in a single act of self-division, but supposing it to be completed in twenty-four hours, we should have, as the progeny of a single frustule, the amazing number of one thousand millions in a single month; a circumstance which will in some degree explain the sudden or at least rapid appearance of vast numbers of these organisms in localities where they were but a short time previously either unrecognized or only sparingly diffused." (Smith, p. 25.)

The structure of the silicious portion of the Dictomaceae is the most remarkable part of their organisation. The following is Meneghini's account of this organ.

"Every Diatom is formed of a silicious shield and a soft substance therein contained. According to Kützing, this shield consists of pure silica, or, in some cases, perhaps, of silica combined with alumina. Nägeli further says that the silica is deposited in the outside of an organic membrane, which he believes to be of a vegetable nature. In fact, an organic membrane ought to exist, for the silica could not become solid except by crystallizing or depositing itself upon some pre-existing substance. On the other hand, we cannot admit, with Nägeli, that it has been deposited externally for in many genera, and especially in the Achnanthes, the silicious shield is covered with a very delicate, delicate membrane, itself containing silica, as is proved by its soon taking on an adamantine lustre of fire and acids. Therefore, comparing this shield with other organic formations, whether animal or vegetable, containing in like manner either silica or some other so-called mineral element, we may reasonably consider it to be formed of an organic tissue per se. It occurs either in the wall of a single cell, as is seen in the epidermal cells of many plants, or within minute cells, as in various plants and animals. The action of heat, or of acid, in these cases, destroys the organic matter and leaving the silica unaltered, does not alter the apparent form of the organ, because the skeleton remains unaltered.

"Externally to the shield Kützing observed a thin stratum which he denominated cement, which may be made visible either by desiccation or by calcination; and produces either a simple opacity, or lines, points, and maculae, sometimes irregularly disposed, sometimes regularly. He supposes it to be a silicate of iron or of alumina. Independently of the chemical materials which it may contain, this outside integument seems to serve the more important function of allowing, without resorting to the means indicated by Kützing, I observe it to be constant, not merely in the species enumerated by him, but also in many others, and I could almost assert that it exists in all. For to me it appears to correspond with that fine membrane of the Achnanthes, above mentioned, which, according to Kützing's own observations, is always visible whenever the two new individuals (into which every Diatom is resolved in its multiplication by division) (conspicua) begin to separate. The line and points supposed to belong to the subjacent shield belong very frequently to this kind of covering.

The shield itself is formed of at least four pieces, or valves, united together in a four-sided figure—a tetragon. The mode of union is unknown. But the existence of a kind of articulation which permits an opening and closing, like the valves of a shell-fish described by Corda in a species of Sarracina, has been denied by other observers. Be this as it may, whether spontaneous after death or induced by external means, this separation does take place in a regular manner. Now, if we suppose an organic cell with a wall permeated by silica, and with a four-sided figure, we can easily suppose that all the sides will mechanically support each other. Moreover, we shall meet with numerous forms by a different kind of analogy, namely, that with solid animal tissues belonging either to the internal or the external segment.

The four valves are equal in length, but in many species and genera one pair exceeds the opposite pair in breadth. In order to establish a uniform language it is convenient to term those primary valves or surfaces which exhibit along the middle the line of division in the act of decadution, which, since it is formed here in a normal plane, is parallel to the other two surfaces, denominated lateral. Along the primary surfaces we frequently see longitudinal lines, which terminate at the two extremities in small apertures. From their internal surface there project into the cavity linear or curved variously formed but always longitudinal; these are termed vitre.

The lateral surfaces have frequently a round aperture of greater or smaller size in the centre, and from this a finer external line is continued. This fissure either remains itself gradually or expands into a circular aperture. When this occurs each of these surfaces is divided into two distinct valves. On these lateral surfaces we observe the striae, lines, and transverse costae, no less admirable for their beautiful appearance than for their constant regularity in number, direction, and proportion. When many individuals are united together to form one compound being, like a polyp for instance, it is always by the lateral surfaces that they are彼此, and since all other characters at times fail, we can affix to them the denomination 'lateral' from this principal one.

Besides the vitre before mentioned, in some general (Biddulphia, fig. 15, Climacospherina, Terpinia) there are other vestiges in their internal cavities; these are variously arranged.

These essential peculiarities of the shield may perhaps
be regarded as indicating a complex structure, very different therefore from what would be prescribed by a simple cellular wall. Ehrenberg deduces from it an argument to compare it with the shell of 

*Holocyclus.* The *Arelithae* may be cited among the Infusorians, Kützing states, in reply, that among vegetable cells there is found a peculiar conformation of the walls, with prominences, depressions, points, lines, papilles, and perforations, disposed in a regular manner; he refers to grains of pollen, as an instance. He might have added the more appropriate from the Pointed Bacillus, which would be very closely allied to the *Diatoms,* if the latter, like the former, could be referred to the vegetable kingdom. If not equal in constancy and regularity, the *Diatomacee* display a greater degree of complication; and we must remember the different nature of the wall in the vegetable cell, when lime or silica predominates, the wall becomes uniform and regular (I) (uniforme et irregolare).

The silicaceous epidermis presents an extraordinary variety of forms, which in every genus and species offer the best possible means of distinction and identification: striæ, or lines frequently moniliform, dots arranged in a radiate or concentric manner, and minute divisions presenting perfectly hexagonal outlines, are amongst the most frequent occurrences. *Diatomacee* are of the most minute size, and the wall, as supposed by Ehrenberg and Kützing, these foraminæ are also denied by Schleiden. Mr. Smith denies also that the valves are externally covered with any organic membrane.

The delicacy of the markings on many of the *Diatomacee* render them objects peculiarly adapted for testing the powers of the object-glasses of the microscope. The following table, drawn up by Messrs. Sollitt and Harrison of Hull, to whom microscope, indubitably few hours, and the first pointed out this nature of these. Mr. Smith says, "I am disposed to regard them all as modifications in the arrangements of the silex of the valve, arising from the mode of development peculiar in each case to the membrane with which the silex is con- tained." He also denies the existence of perforations in the valve, as supposed by Ehrenberg and Kützing. These foraminæ are also denied by Schleiden. Mr. Smith denies also that the valves are externally covered with any organic membrane.

The *Diatomacee* possess the power of moving. "The cells have no special organs for these movements. But as, in consequence of their nutritive processes they take in and give out fluid matter, the cells necessarily move when the attraction and the emission of the fluids is unequally distributed on parts of the surface, and is so active as to overcome the resistance of the water. This motion consequently is observed more particularly in those cells which, in consequence of their taper forms, easily pass through the water; these cells moreover move only in the direction of their long axis. If one half of a spindle-shaped or ellipsoidal cell chiefy or exclusively admits material, the other half, on the contrary, giving it out, the cell moves towards the side where the admission takes place. But, as in these cells both halves are physiologically and morphologically exactly alike, so it is that it is first the one and then the other half which admits or emits, and consequently the cell moves sometimes in one, and sometimes in the opposite direction."

This is perhaps as satisfactory an explanation of these movements as can be given in the present state of our knowledge. All observers agree that they can find no evidence to support Ehrenberg's notion of a pedal or mantle organ projected from the interior of the silicious shield. The Rev. W. Smith has also detected ciliaison in the *Diatomacee.* "A distinct movement," he says, "of the granular particles of the endochrome, closely resembling the ciliaison of the cell-contents in *Clathriona Lamellata,* noticed by Mr. Ralfs [Desmids], and which I have frequently detected in the same species, has occasionally fallen under my notice in some of the larger forms of *Diatomacee.*" He has observed it in *Surirella distorta.* (Fig. 4.) "I call this circulation," he continues, "has not however the regularity of movement so conspicuous in the *Diatomacee,* and is of too ambitious a character to furnish data for any very certain conclusions, save one, namely, that the Diatom must be a single cell, and the entire division of its contents, such as have been alleged to occupy its interior; since the endochrome moves freely from one portion of the frustule to another, approaching and receding from the central nucleus, unimpeded by any intervening obstacle.

The *Diatomacee* are therefore abundant and extensively distributed of unicellular organisms. They are found in the ocean, at the mouths of rivers, in brackish waters, in rivers, lakes, ponds, ditches, pools, and claterra. In fact, wherever a few drops of water are allowed to remain exposed to the air, we may expect to find forms of *Diatomacee.* Their forms are not less abundant than their presence. In the first volume of his *Synopsis of the British Diatomacee,* the Rev. W. Smith has described upwards of 230 species, and the *Diatomacee* of the Thames and its tributaries, *i.e.* few species known in Great Britain is considerably above 800. The facility with which their forms are preserved, give to these objects a great advantage, and a handful of sand from the sea or mud from a river in the most remote district of the world may be made to yield a vast number of new and abundance of new forms. They occur in great abundance in the river Thames, and its mind affords a large variety of the frustules of those which have ceased to exist. In a few drops of water from the *Excursion of the Thames and Other Water,* by Dr. Lancaster and Redfern, upwards of forty species were observed.

The mode of collecting living specimens for observation is simply to allow the water in which they exist to stand for a few hours in the sunlight, when, by carefully cleansing the vessel, a portion of the water, a portion remains at the bottom of the vesel more turbid than the rest, and which generally contains in large numbers the objects sought for.

In describingshowers of coloured dust which have occurred in various parts of the world, Ehrenberg has demonstrated that various forms of *Diatomacee* have been found present. In some seasons these organisms occur in such numbers in the waters of rivers as to give to their banks a peculiar physical aspect. In the autumn of 1861 the stones and pebbles in the nearly dried-up bed of the Annan, in Dumfriesshire, presented an appearance as though they were white-washed. The substance which gave the stones this appearance could be scraped off, and looked like some form of calcareous matter. One of these pebbles was observed to pass through the mouth of a fresh-water mollusc. Lankester found that it consisted entirely of the silicious shields of a species of *Syndra.* (Fig. 5.) In the first volume of the new series of the *Transactions of the Microscopical Society,* Mr. Shadbolt has given an account of the examination of portions of mud given him by Mr. Pick from the Natal. This mud was recent, and from the nature of the specimens in it, Mr. Shadbolt thinks it probable that it was obtained not far from the mouth of some river. In this mud was made out fifty-five distinct species of *Diatomacee,* twenty of which has described as entirely new species. In the *Microscopical Journal* for July, 1853, Mr. Brightwell of Norwich has described nine new species of one genus—*Triceratium.* Six of these are recent. He says, "We have received near the Tamar a recent mud obtained from the near surface of the large sea-shells of the genera *Hipponus* and *Haliothis* before they have been cleaned. Many of them in this state are covered with small zoophytes, minute algae, and other parasites..."

One of the most singular positions in which *Diatoms* are found is in the guano brought from America and Africa. They have been observed by many observers to be frequently found by fish and subsequently by birds; their shields, however, have been able to withstand this double process of digestion, and they are found in large numbers in every pure specimen of guano. Some of the forms which have been preserved in this natural manner have been found amongst the most singular of the family. It has been suggested that the silex thus introduced into the guano may contribute to its fertility, as it is well known that this sub-
instance is present in the stems of all our cereal grasses, and is necessary to their growth.

It may be confidently said that, for the time being, the results of the present investigation will be found in many of the older formations of the earth's surface. This is very extensively the case; although it may be doubted whether, from the fact of their being occasionally found in igneous rocks, that they were not found there by the action of water. The regular occurrence of very small animals is, however, an indication whichEbeneberg has been able to detect in their presence in some of the earliest rocks of the Palaeozoic series. How *Diatomaeeas* may be present in igneous rocks has been suggested by Dr. Hooker. During his voyage with the *Erebus* in the Antarctic Ocean he says, 'This order occurred in such countless myriads as to stain the sea everywhere of a pale ochreous-brown, in some cases causing the surface of the ocean, from the locality of the ships, as far as the eye could reach, to assume a pale-brown colour.' This immense increase of organisms persisting are producing a sub-marine deposit, or bank, of vast dimensions, resting on the shores of Victoria Land, and hence on the sub-marine flanks of Mount Erebus, an active volcano upwards of 12,000 feet high. Knowing as we do that *Infusoria*, *Diatomaeeas*, and other organic constituents, enter into the formation of the peumice and sabes of other volcanoes, and are still recognisable in their minerals, it is perhaps not unreasonable to conjecture that the subterranean and subaqueous forces which kept Mount Erebus in activity, may open a direct communication between this *Diatomaeeas* deposit and its volcanic fires.

Ehrenberg has described a large number of forms of *Diatomaeeas* from the oolite, cretaceous, and other secondary rocks. Amongst the most interesting in this connection is the description by Sir Robert Schomburgk in the 'Reports of the British Association for 1847, furnished him with an entirely new group of beings apparently related to this family. The following is Sir Robert's account of this discovery:—

'In the white marls and other rocks of Scotland district, Professor Ehrenberg of Berlin discovered a new and great group of siliceous-shelled animals, which, in a report read before the Royal Academy of Sciences, he described as *Polygynites* and *Polythalamis*. These animals are remarkable and articulate shells which cover these animals distinctly. They possess large apertures at the extremity of the body, which has no analogy among plants, but occur very commonly among animals. These siliceous loricated organic forms in the rocks in Barbadoes differ alike from *Polygynites* and *Polythalamis*, but develop an important relation to these two groups, which Professor Ehrenberg considers, not upon any general arrangement of animals possessed of vessels but with a heart and intesinal canal, and provided with a simple tubular intestinal canal. The forms developed in this highest degree in that direction would be *Holothuria* and *Bolinoides*.

The minute forms of organic life in the rocks in Barbadoes, as far as investigated by Professor Ehrenberg in February, 1847, consist of the following groups:—

*Polygynites*...392
*Polygynites*...18
*Polythalamis*...27
*Polythalamis*...7

Of these more than 300 are new forms.

The great discovery of the *Polygynites*, which might be almost called a new class, since they amount to upwards of 200 species, a larger number of specific forms than is contained in some classes of animals, may guide to form the idea of the geological age of the rocks in Scotland district, by comparing these forms with similar fossil animals from rocks upon the age of which geologists have agreed. Ehrenberg has been able to compare the *Polygynites* from the rocks of Barbadoes resemble more the animals from rocks of the secondary period than the tertiary.

Amongst the varieties of quartz rock the mineralogist recognises, under the name of tripli and polishing powder, certain white and pearly forms of quartz. On placing these substances under the microscope they are found to be entirely composed of the silicious frustules of *Diatomaeeas*. The polishing powder or slate (polish-sliers) found at Bilu in Bohemia is used for the purpose of producing a polish on fine surfaces. The regularity and beauty of the frustule of the Diatom will adapt them to this purpose.

Another deposit in which the *Diatomaeeas* have been found in great abundance is the Bergmei of Sweden. (Bramant, p. 1.) The Diatoms found by Ehrenberg in this formation are principally species of *Navicula*. (Fig. 6.)

Amongst the tertiary deposits, beds of *Diatomaeeas* are very common. They have been observed in Italy, in Germany, and in several of the States of America. 'The city of Richmond in Virginia is said to have been built upon a stratum of *Diatomaeeas* remains, 18 feet in thickness.' (Smith, Professor Gregory of Edinburgh has recently described, in the 'Transactions of the Microscopical Society,' a *Diatomaeeas* earth, discovered about two years ago by the Duke of Argyll in the Lake of Mull. It constitutes a bed, resembling marl in appearance, lying in a rough piece of ground between Loch Baa and the sea. The lake is about 30 feet, the land about 40 feet, above the sea-level. At one part there is a hollow, which in winter used to become a small loch, in summer only a stagnant pool, and in draining this the bed of marl was discovered. The bed rests upon gravel, which appears to belong to the diluvial period, and the *Diatomaeeas* earth is probably of recent origin. Professor Gregory has excavated the bed with great care, and has given a list of upwards of 130 species, which he has been able to make out ('Quarterly Microscopical Journal,' January, 1854). Of these upwards of twenty are altogether new species, or species that are new in a British locality.

From these facts it appears that the subject of fossil *Diatomaeeas* promises an almost boundless field for further inquiry. It appears that we may say of these organisms what we can say of no other family or group of organised beings, that once created they exist for ever. Myriads of species of soft-bodied animals have perished, never to be recognised, but each individual cell of the Diatom leaves its silicious wall as a record of its existence—a record that the ordinary forces of nature seem to have little or no power in obliterating.

We now turn to the subject of arrangement. It would be of course impossible here to give any account of individual species, and systematic arrangement are being constantly modified by new discoveries. The following is an arrangement of the families or tribes by Kitting:—

**Tribe I. Striates.**

Order I. Automatace.

Without a central opening on the secondary valve.

* Transverse strie unbroken.

Family 1. Unstricte.
Family 3. Fragilartieri.

**Strie broken (interrupted) in the median line.

Family 5. Surstricte.

Order II. Siatomatace.

With the central opening.

* Monostriate.

Having a median aperture on only one of the two secondary surfaces.

Family 6. Cocoonostric.
Family 7. Acho.nostric.

* 8 Diatomatace.

With a median aperture on each secondary surface.

Family 8. Cymbellicr.
Family 9. Cymphephonata.

**Tribe II. Violate.**

Order I. Automatace.

Without central opening on secondary side.

Family 11. Lichomophora.
Family 12. Strictelata.
The Rev. W. Smith, in his "Synopsis of the British Diatomaceae," gives the following arrangement of the genera:

**Sub-Tribe I. Frustules naked; not imbedded in gelatine or inclosed in membranaceous tubes.**

### Sub-Tribe 1. Connecting membrane detached; frustules solitary, or during self-division in pairs; rarely in greater numbers, adherent or free, dispersed, or aggregated into a mucous stratum.

**22 Genera—**

- *Epithemia* (fig. 19). 16 species.
- *Euxanthea* (fig. 1). 7 species.
- *Cymbella* 6 species.
- *Amphora* 8 species.
- *Cocconeis* 6 species.
- *Eucocconeis* 1 species.
- *Esperdus* (fig. 2). 5 species.
- *Actinocyclus* 1 species.
- *Arachnoidiscus* 1 species.
- *Triceratium* (fig. 3). 2 species.
- *Cyclotella* 4 species.
- *Campylodiscus* 7 species.
- *Surirella* (fig. 4). 20 species.
- *Trybionella* 6 species.
- *Gymnosulcia* 2 species.
- *Nitzchia* 23 species.
- *Amphipora* 5 species.
- *Amphipleura* 5 species.
- *Navicula* (fig. 6). 26 species.
- *Pennularia* 24 species.
- *Stauronella* 10 species.
- *Pleurosigma* (fig. 7). 26 species.

**Sub-Tribe 2. Connecting membrane persistent; frustules after self-division attached by a gelatinous cushion, or dichotomous stripes.**

- **7 Genera—**
  - *Squerna* (fig. 5). 24 species.
  - *Doryphora* 2 species.
  - *Cocconeis* (fig. 8). 4 species.
  - *Gemmophora* (fig. 9). 12 species.
  - *Podolenia* 5 species.
  - *Rhizopleura* 3 species.
  - *Lichemomenta* 9 species.

**Sub-Tribe 3. Connecting membrane evanescent, or obsolete; frustules after self-division united into a compressed filament.**

- **12 Genera—**
  - *Meridion* (fig. 10). 2 species.
  - *Bacillaria* (fig. 11). 1 species.
  - *Humasonida* 7 species.
  - *Odontidium* 4 species.
  - *Denticula* 4 species.
  - *Fragilis* 3 species.
  - *Encocoma* 1 species.
  - *Achnanthes* (fig. 12). 6 species.
  - *Diademia* 3 species.
  - *Rhodonesma* 2 species.
  - *Scaphidium* (fig. 13). 1 species.
  - *Tetragynia* 1 species.

**Sub-Tribe 4. Connecting membrane persistent; frustules after self-division united into a zigzag chain.**

- **6 Genera—**
  - *Diatoma* (fig. 14). 4 species.
  - *Grammonobaculum* 2 species.
and curious books at extravagant prices, was advancing to a height which it had never before attained in England or elsewhere. It reached its culminating point at the celebrated sale of the library of the Duke of Roxburghe, in June 1912, where a copy of an early edition of Boccaccio, printed by Valla in 1471, and later owned by the Marquis of Blandford, afterwards Duke of Marlborough, for the sum of £2260; and it was afterwards discovered that an imperfect copy of the same book was in the Sunderland library at Blenheim, at the very time of the purchase, but had three times been sold since it was first mentioned in the catalogue.

Dr. Dibdin proposed, at a dinner party at Baron Bolland's, even before the Valdarker was sold, the establishment of a club, to dine together in honour of Bibliography. The club was established under the name of the Roxburghe Club—a name which, from this time forwards, the vice-president of the club adopted the rule that each of its members should every year reprint a book, to be presented to every member; and this practice seems to have led to the establishment of the numerous printing and publishing clubs now in existence, more liberal in their regulations than the original. The rise and progress of the bibliomaniac was stimulated and recorded by different publications of Dr. Dibdin: an 'Introduction to the Greek and Roman Classics,' in 1802; a dialogue, entitled 'Divorce from the World,' which was translated into Italian by Sbracia, in 1803; the 'Lectures on the English Enlargements, in 2 vols., in 1811; and the 'Bibliographical Decameron' in three large vols., in 1817. A new edition of Ames's 'Typographical Antiquities' was also commenced by him, and in 1816 was published in four vols., in 1819; and a minute account of the rare books in Earl Spencer's library, under the title of the 'Bibliotheca Spenceriana,' which occupied four volumes, and was extended by the 'Édites Alitheriane,' a description of Earl Spencer's seat at Althorp, and the arrangement of his library purchased by him; in the whole, seven volumes. In 1815, Dr. Dibdin made a tour abroad, to purchase books for the same patron, and the result was, a 'Bibliographical, Antiquarian, and Picturesque Tour in France and Germany,' 3 vols. 16mo, 1818. Dibdin also published his 'Decameron' and the 'Tour,' present beautiful specimens of typographv and engraving, produced at an expense which the author was never weary of proclaiming. In 'The Library Companion;' or, 'A Compendium of the Cambridge Oratory and the Choice of a Library' (1834), he apparently aspired at producing something of more general and permanent use; but the result was disastrous. The flippant and frivolous character of his remarks, and the inaccurate and superficial character of his information, were commented upon in so severe a tone by some of the leading reviews, in particular the 'Quarterly' and the 'Westminster,' that his reputation never recovered the shock. In the preceding year he had obtained permission of Earl Spencer, his first patron, to enter the library, and afterwards to be appointed to the rectory of St. Mary's, Bryanston Square, London; and his publications for some years were chiefly of a theological character. He retired to the field of English literature, and was for a short time the Editor of the London Literary Journal (3 vols. 1836), and in his 'Bibliographical, Antiquarian, and Picturesque Tour in the Northern Counties of England and in Scotland' (3 vols. 1838). He also made, not long before his death, a tour in Belgium, of which he also intended to publish an account. He died on the 10th of November, 1847, after a long illness, of paralysis of the brain. His latter years had been much clouded with pecuniary difficulties.

The most important of the publications of Dr. Dibdin have already been enumerated, but it will be necessary to recur to some of them to afford a fuller notion of their character. The most important is the 'Typographical Antiquities of Great Britain.' The meritorious work of Ames on that subject, facing to an account of all the books printed in England from the introduction of the art to the year 1600, had been expanded from one volume to three by Herbert, who made such extensive additions that the work might justly be regarded as his own. Dr. Dibdin's work was full room for extensive improvement on Herbert—a very similar alteration even in the arrangement would have much increased its value to nearly all who consulted it. The titles of the books are disposed under the names of the printers: had they been arranged, according to his 'Annals of German Literature,' in the plain order of date, a host of particulars would have presented themselves in combination which are now scattered and inacceessible. It would have been far from uninterseting to observe what books issued from the press in England during the year in which Henry broke up the monasteries, in which Mary lighted the fires of Smithfield, or in which Shakspeare first came to London. Dibdin has preserved the old arrangement, and has so much added to it, that the reader, who desires to know the contents of his edition, which was left imperfect, carry the record no further than the middle of the second volume of Herbert's three. Some of the matter which he has added is of interest, in particular his more minute account of the productions of marriage, and of our book-collectors. Dr. Dibdin is the only one of the book-collectors of the 18th century, illustrated with their portraits, which have nothing whatever to do with the history of printing in the 16th and 17th centuries. Much too of the additional matter for which the work was undertaken, has been taken from notes which Herbert had prepared for a second edition, and inserted in a copy of his work which is now in the British Museum. It is to be hoped that the whole subject will be resumed ere long by some competent scholar, with the numerous additional materials now at his command in our public libraries, when, with some industry and intelligence, a work may be produced which will interest not only the bibliographer but all who have a tincture of feeling for literary matters. The 'Bibliotheca Spenceriana,' from which, indeed, the whole of the latter part of this volume is taken, is another instance of the peculiar relationship of the work to the public in general, is often used as a work of reference: but those who have consulted it will find it vastly different from the attempt at it. The whole of the latter part consists of a book too little of the scholar and the man of letters, and too much of the bookseller and the bookbinder. The width of the margin, and the kind of leather in which a book is coated, astonish as much of his state no less than the accident which all copies of the book have in common. The 'Decameron' is by far the best of Dr. Dibdin's works, as comprising the least of detail and the most of anecdote; and it is written in many portions with a degree of care and spirit often wanting in his other works. The 'Reminiscences' afford singular proof that, although the author of an 'Introduction to the Classics,' his acquaintance with some of whom was of a very temporary character, he was acquainted with all of the bibliographical works abound with much that the reader wishes away, they are indispensable in any large library of English literature. His other productions, which are numerous, are 'Dichrote,' and 'Reminiscences.'

DICHROITE. [MINERALOGY, S. I.]

DICK, THOMAS, LL.D., was born in 1772. He was educated for the Christian ministry in connection with the Wesleyan Church of Scotland, and was a preacher in connection with that body in the early part of his career, but it is as a popular writer on physical science that he is best known to the world. The works by which he first became generally known were the 'Christian Philosophy of Religion,' in 1819, followed by works on the 'Improvement of Society by the Diffusion of Knowledge,' the 'Mental Illumination of Man,' 'The Philosophy of a Future State,' 'A Treatise on the Solar System,' 'Celestial Scenery,' 'The Sidereal Heavens,' 'The Practice of Astrology,' 'Prophetic and Christian Benevolence,' contrasted with Covelunoonism,' written in competition for the prize which was conferred on Mr. Harris for his work, entitled 'Mammon: or Covetousness the Sin of the Christian Church.' Dr. Dick was a man of unimpeachable integrity and disposition, who devoted himself to labour perseveringly for the public instruction, although his immediate reward was but small. His principal works were reprinted at low prices, and had extensive circulation, especially among the working classes, from which he derived his support. A public subscription on his behalf, as an acknowledgment of the benefits he had conferred upon society, was projected a few years since by some of his admirers,
but realised a very small amount, most of it being raised in the town of Dunedine, where the subscription was commenced. Dr. Dick's works have been reprinted and very extensively sold in the United States. Dr. Dick resided in the small village of Trinity-Bay, on the left bank of the river Tay, in Forfarshire. Besides instructing the pupils by his pen, Dr. Dick had been in the habit of accepting occasional appointments to preach in neighbouring churches, and also to deliver popular lectures on scientific subjects. A few years ago he moved to New Zealand, where he was occupied in the advancement in the advancement of popular science. He died July 20, 1857.

DICTYOGNIS, a class of plants, proposed by Lindley, and adopted in his 'Vegetable Kingdom.' It embraces a number of peculiarly marked species, belonging to the classes of

Exogens and Endogens. They have a monocotyledonous embyro, but they also have a broad net-veined foliage, which usually disarticulates with the stem. The following are the natural orders of Dicthyogynae:—

Placenta saxifraga, Carpels uniseriata, Perianth free, Carpels 00; one seeded.

Carpels bisexual. Perianth adherent.


DIDYMIUM, a generic name used by Mr. Loddiges, [Chemistry, S. 1.]

DIDYMOPHUM, a generic name used by Mr. Loddiges, [Chemistry, S. 2.]

DIEGO, SAN. [Canada, S. 2.]

DIGINITE, a native Sulphurpet of Copper.

DILMAN, a town in Perú, is situated on the caraván route from Tabriz to Erzerum, 70 miles W. from Tabriz, 10 miles W. from the north-west angle of Lake Urmiyeh, and has about 16,000 inhabitants. It is situated in the wide and fertile plain of Selmas, which stretches westward from the lake to the base of the Kurdish Mountains. The town is surrounded by gardens and orchards, and has clean streets. The plain about it is inhabited by Nestorians, Armenians, Catholics, Kurdish Leks, and Russian emigrants. About 4 miles to the westward is the old town of Dilman, a great portion of which is in ruins. From the number of mounds in the district, and the ruins of buildings in the immediate environs, it appears to be of considerable extent, and it is described by St. Martin as being a very ancient Armenian city. (Colonel Sheil, in London Geographical Journal, vol. vi.)

DINORNIS, a genus of birds probably extinct, the remains of several species of which have been found in New Zealand.

In November, 1839, Professor Owen exhibited, at a meeting of the Zoological Society of London, the fragment of the shaft of a femur, 6 inches in length, and 5½ inches in its smallest circumference, with both extremities broken off. This bone of an unknown struthious bird of large size, presumed to be extinct, was put into the Professor's hands for examination, by Mr. Rule, with the statement that it was found in the neighbourhood of Wellington, the capital of the island, that it belonged to a bird of the eagle kind, which has become extinct, and to which they gave the name Movie or Moa. Similar bones, it was said, were found buried on the banks of the rivers. After a minute description of the bone, Professor Owen made the following statement:—'There is no bone of similar size which presents a cancellous structure so closely resembling that of the present bone as does the femur of the Struthios, and it is placed in the ostrich at the middle of the shaft, where the peristyles of the medullary or rather air-cavity, are smooth and unbroken. From this difference I conclude the struthious bird indicated by the present fragment to have been a heavier and more stupid creature than the ostrich, and its femur, though its whole leg, was shorter and thicker. It is only in the ostrich's femur that I have observed superficial reticulate impressions similar to those on the fragment in question. The ostrich's femur is subcomprised, while the present is cylindrical, approaching in this respect nearer to the femur of the emu; but its diameter is one-third greater than that of the largest emu's femur with which I have compared it. The bones of the great Pelecanus, in the extremity of the shaft, are solid throughout; those of the preceding, proceeding from a cancellous structure like the present bone. The cancellous nature of the mammiferous long bone is of a much finer and more fibrous character than in the fossil. Although I speak of the bone under this view, there can be no doubt that it presents the characteristics of a true fossil; it is by no means mineralised; it has probably been on or in the ground for some time, but still retains most of its animal matter. It weighs 7 ounces 12 drachms avoidopris.'

The discovery of a large struthious bird in New Zealand is one of peculiar interest, on account of the remarkable character of the existing Fauna of that island, which still includes one of the most extraordinary and anomalous genera of the struthious order; and because of the close analogy which the event indicated by the present relic offers to the extinction of the Dodo of the island of the Mauritius. So far as judgment can be formed of a single fragment, it seems probable that the extinct bird of New Zealand, if it be certainly of the extant, has the legs, and nearly resembling those of the Dodo than of any of the existing Struthiones. Any opinion however as to its specific form can only be conjectural. The femur of the Stilt-Bird (Himantopus) would never have revealed the anomalous development of the bones of the legs. The conclusions of my skill in interpreting an osseous fragment may be credited, I am willing to risk the reputation for it on the statement that there has existed, if there does not now exist, in New Zealand, a struthious bird nearly if not quite equal in size to the ostrich.'

It was not long before an opportunity occurred of testing this very remarkable statement, and of proving the sagacity of the naturalist who had thus staked his reputation upon his conviction of the truth of the general principles of the science of comparative anatomy. Professor Owen received a communication from the Rev. W. Cotton describing several other remains of animals of the same kind, and in 1843 a collection, comprising vertebrae and bones of the hinder extremities, pointed to some 20 feet. The other bones, which I was granted by the Rev. W. Williams to the dean of Westminster (Dr. Buckland); and in 1846 many specimens were sent to England by Dr. MacKellar, Mr. Percy Earl, and Colonel Wakefield. These were placed in the hands of Professor Owen, and form the subject of his first and second 'Memoirs on the Dinornis,' in the 'Zoological Transactions,' vol. iii.

In these Memoirs Professor Owen pointed out that the bones which had been thus sent over from New Zealand had contained of no less than twelve of these remarkable group of birds, which he at first supposed belonged to the family of Struthiones. Subsequent examination however has led Professor Owen to the conviction that although witness, these birds have an intimate connection structurally and physiologically with the ostriches as with any other group of recent birds.

From an examination of the various bones thus collected, Professor Owen was enabled to point out that the fragment of bone which he had first received belonged to a species of the genus not only much larger than any of the other species indicated by these remains, but larger than any form of existing bird. To this species he gave the name of Dinornis giganteus, and found that the height of this bird must have been between 6 and 8 feet, while its feet presented a peculiar structure, the four toes on the feet being 4, and the toes of the foot 2 inches. These were described as—D. ingens, attaining a height of 9 feet; D. struthoides, 4 feet; D. dromaioides, 5 feet; D. struthoides, 4 forwards and 8 backwards. In addition to these were described—D. curtus, D. ornatus, D. ocellata, and D. carrus. These remains showed the existence of a number of birds, varying in size from the almost flightless Bustard to birds of the size of the Dodo, the Emu, and the Ostrich, and one larger than all.

On a subsequent examination of the bones of D. ingens and D. dromaioides, Professor Owen discovered a back toe which he had seen nowhere in the other species, and for these he proposed the generic name Polyapteryx. To these two species he added a third species, P. gersonioides, Dr. Mantell gives the following:—A further discovery of the remains of birds in New Zealand:—

"In 1846 and 1847 my eldest son, Mr. Walter Mantell, of Wellington, who had resided several years in the colony,
explored every known locality of these fossil bones within his reach in the North Island, and went into the interior of the country, and located with the natives, for the purpose of collecting specimens, and of ascertaining whether any of these great bones are in existence, resolving, if they appeared to be the least chance of success, to penetrate into the unfrequented regions, and obtain a live Moa. The information gathered from the natives offered no encouragement to follow up the pursuit, but tended to confirm the idea that there was not a specimen in the country. To prove the occurrence of this species, related to the Apteryx, the living diminutive representative of the stupendous ostrich-like birds which once trod the soil of New Zealand. My son succeeded however in forming the most interesting collection of these remains hitherto obtained. It comprised between 700 and 800 bones belonging to birds of various species and genera, and differing considerably in magnitude and age, some belonging to very young individuals, in which the epiphyses of the long bones are distinct from the rest, while others are those of adult and aged birds. The chief part of this collection is now deposited in the British Museum.

The locality from which these specimens were obtained is thus described by Mr. Mantell:—"Near Waikorati, 17 miles south-south-east of the headland of the Point, a level plain, three-quarters of a mile in length and 150 in height; it consists of sandy clay distinctly stratified and traversed by dykes of columnar trap, the columns being at right angles to the sides of the veins. In a little bight, south of Island Point, there is a stretch of sand which forms the mainland at the entrance of the River Waikorati in front of the native Kaiks, named Makuku, is situated the exposed parts of the so-called turbarry deposit, whence bones of Moas and other birds of various kinds have been obtained in number and perfection. This bed is about 3 feet in depth and not more than 100 yards in length, and lies immediately on a stratum of tertiary blue clay; its inland boundary is obscured by vegetation, and appears to be of a very limited extent. The bed is entirely submerged, and only visible when the tide has receded. It consists almost wholly of decayed vegetable matter, and its surface is studded with the undisturbed roots of small trees, which appear to have been burnt to the ground at some remote period. It is a light, sandy, elastic earth, of a blackish-brown colour, and emits a strong fetid odor when first collected; from the large quantity of animal matter it contains I conceived it was originally a swamp or morass, in which the New Zealand Plax (Phorhinum torquatum) still abounds. It is covered by the heath, and it is probable that the water in the bed, for fear that it will be entirely washed away, without yielding to the paleontologist all the desired information respecting the extinct animals whose relics it envelopes; for the natives and whalers are well aware of the interest attached to the bones by Europeans, and they seize them indiscriminately on any specimen exposed by the receding tide, and if it cannot be readily extracted they break it off, and thus many a valuable relic has been destroyed. Their cupidity and avarice have been so increased by the language given by casual visitors, that the cost of specimens has increased to an unreasonable amount."

In their general aspect the bones which have been obtained from this spot closely resemble those obtained from the oseiferous caverns in Germany. Professor Owen gives a detailed analysis of their chemical composition, and from this infers that they may have been recently deposited. Mr. Mantell obtained bones also from North Island:—"On the western angle of the island sixty miles south-west of New Plymouth, there is a stream called Waikorati, into which empties itself into the sea a: about a mile and a half south of Waimate in the Ngiiruga district. Part of the neighbouring country is elevated table-land, with deep tortuous gorges, and the edges of the cliffs near the foot of the mountain take the water into the course of the river. That of Waingaonou, which is as tortuous as any to them, takes its rise in the neighbouring volcanic ridge, and has evidently at a former period discharged itself far distant from its present embouchure, as is proved by the existence of a line of cliffs which extends inland, and has manifestly been produced by the corroding action of the river. Driven from its course probably by a change in the relative level of the land and sea, the stream has formed its present channel, which cuts through a bed of loose conglomerate, 100 feet thick, overlying a deposit of finely-laminated sand, which covers a thick stratum of blue clay full of shells. The conglomerate consists of pebbles and larger boulders of an infinite variety of volcanic rocks; the clay is very fine, but more or less indurated, and well interspersed with marine and resemble species existing in the South Pacific Ocean; but I suspect many will be found specifically distinct from any recent forms. Between the two bluffs near the embouchure of the river, there is a large flat bed of the sandstone, which on my first visit was strewn with bones of men, moas and other birds, and two species of seals. I had some deep openings made near the foot of the ancient cliff on the top of which is the Pa or native village of Ohawato-koloko, and at the same level as the flat on which I had observed the fragments of bones I came to a regular oseiferous deposit. The bones however though perfect were as soft and plastic as putty, so that if grasped strongly they changed as it were by magic into pipeclay; and it was necessary to dig with animals to preserve them to the air and sun to dry, before they could be packed and removed. Unfortunately the natives soon caught sight of my operations, and came down in swarms, men, women, and children, trampling on them and pulling out the bones, leaving them in disorder, setting upon every morsel exposed by the spade. My patience was tried to the utmost, and to avoid blows I was obliged to retreat and leave them in the possession of the field; and to work they went in right earnest, and quickly made away. The bones of other native creatures, D. d'escrignaw, and D. camaronius; also of Palapteryx ingess, variety rubra, and of a new species, P. geranoides. Notwithstanding the great number of bones that have thus been examined, one fragment only of the wings or humerus has been detected. This indicates the rudimentary condition of the bones in these birds. The hammers found Professor Owen regards as belonging to a species of Palapteryx. The following is a summary of the nature of this collection by Professor Owen. 'These bones are only large and particularly referrible to five species of Dinornis, Palapteryx, and Notornis, and there are 18 taro-metatarsals, with the articular surface for a very strong hind toe, and of a conformation more nearly resembling those of the Dodo than of the Dinornis. Because of the great length of these bones, as compared with the size of the tibia, and the articulation of the tarsus, there is a singularly large complete bone canal for the flexor tendons at the back part of the proximal end of the tarso-metatarsal; the perforation above the articular surface of the side between the outer and middle metatarsals for the tendon of the adductor muscle of the arch, and the more extensive groove for the inner toe—all concur to indicate the generic distinction of the bird to which it belonged from either Dinornis or Palapteryx; and I propose to distinguish the new genus by the name of Notornis and the present species A. odidaformis."

"With the remains of bones found upon the banks of the river Waingaonou were mixed the fragments of egg-shells. The eggs to which the fragments belonged were supposed to belong to the ostrich, and the comparison of the egg with the subject the recent discovery of a large egg in Madagascar is interesting."

In a report to the French Académie de Sciences, M. l'abbé Geoffroy St. Hillaire described three enormous fossil eggs
from Madagascar, and some bones belonging to the same bird. The captain of a merchant- vessel trading to Madagascar one observed a native using for a domestic purpose a vase which much resembled an egg, and upon examina- tion proved to be one. The native stated that such eggs were to be found in the interior of the island, and eventually procured the eggs and bones exhibited by M. St. Hillaire. The larger of these eggs is equal in bulk to 136 hen's eggs, and hold two gallons of water. M. St. Hillaire pro- poses the name of Epicorax for the monster biped of which these marvellous eggs and bones are the first evidence brought under the notice of naturalists. Casts of these eggs have been made. Amongst the bones sent home by Mr. Mantell, the remains of a new genus, Notornis, were found. It belongs to the same family as the Brachypteryx and the Rallidae, and the interest that attaches to it in this relation is the fact that Mr. Mantell succeeded in obtaining a single living specimen. Many persons had reported the existence of a wingless bird as large as a fowl, and with red head and legs, with a cry sounding like 'Keo Keo.' The following is Dr. Mantell's account of the discovery and the method of obtaining it; "On my son's second visit to the southern part of the Middle Island (as Government Commissioner for the settlement of native claims), he fell in with some seamen who had been pursuing their avoca- tions along the little frequented islets and gullies of Drury Bay, when they mentioned seeing a bird not unlike the one described in the skin of a recent specimen of Notornis Mantellii. It appeared that when frequenting the coasts in search of seals and other game, these men observed on the snow, with which the ground was then thickly covered, the foot-tracks of a large bird, or rather an estate, the latter at a considerable distance, they caught sight of the object of their search, which ran with great speed and for a long while distanced their dogs, but was at length driven up a gully in Resolution Sound, and captured alive. It nipped, bit, and fought and struggled violently; it was kept alive three or four days on board the schooner and then killed, and the body roasted and eaten by the crew, each partaking of the dainty, which was said to be delicious. The skin, with the foot-tracks and the bones, I have fortunately obtained by my son while in good condition, and thus perhaps the last of the race of Moho was preserved for the naturalists of Europe. Upon comparing the head of the bird with the fossil crania and mandibles, my son was at once convinced of the specific identity of the recent and fossil specimens; and so delighted was he by the discovery of a living example of one of the supposed extinct contemporaries of the Moa, that he wrote to me and stated that the skull and beak were alike in both, and that the abbreviated and feeble bones corresponded with the fossil; and that they were in perfect accordance with the indications afforded by the humerus and sterno found by him at Waingougoa and now in the British Museum, as pointed out in the Zoological Transactions. In this year, my son having, on a voyage in the Whales, my son visited on his homeward route to Wellington, the Notornis was a perfect novelty, and excited great inter- est. No one had seen such a bird, but all agreed that it was the traditional Moho or Takahé, which they had believed was utterly extinct."

"This beautiful bird is about two feet high, and much resembles in its general form the Porphyrio melanocephalus, but it is larger and stouter, and generally distinct; the characters predicated by Professor Owen from the fossil remains being clearly observable. It has a white crown and a black and white neck, and strong, and as well the legs were of a bright scarlet in the living animal. The neck and body are of a dark purple colour, the wings and back being shot with green and gold. The wings are short and rounded, and remarkably feebly both in structure and plumage. The tail is scanty, and white be-neath. The specific identity of the recent and fossil Notor- nis is confirmed by Mr. Gould, who has published a coloured figure the size of the original in a supplementary number of his Journal of Natural History. In addition to the bones of the animals mentioned, remains of other birds were found in the Mantellian collection. These were of a species of nocturnal Parrot, belonging to the genus Necro, of a probably extinct species of Apteryx, of a peculiar order of Diomedes chlororhynchos, and also of the Penguin."

For the structure of the Apteryx and its relations to other birds, see the article STRUTHIONIDAE.

In 1861 Professor Owen received from Governor Grey a large collection of specimens from New Zealand of the bones, and more especially the skulls, of several of the spe- cies, which he described in a fifth memoir presented to the Zoological Society. An almost perfectly restored skeleton of the Dinornis giganteus exists in the Museum of the Col- lege of Surgeons. Professor Owen concludes one of the memoirs referred to with the following general remarks:— "The extinct Aves may be divided into two classes, one the van- 1041 bed of some of the species peculiar to New Zealand, and which have finally become extinct in that small tract of dry land, suggest it to be the remnant of a larger tract or contin- uent over which this singular Struthionida Panna formerly ranged. One might almost be disposed to regard New Zea- land as one end of the mighty wave of the unstable and ever-shifting crust of the earth, of which the opposite end, after having been long submerged, has again risen with its accumulated deposits in North America, showing us in the Connecticut Sandstones of the Permian period the foot-prints of the gigantic birds which trod its surface before it sank; and to surmise that the intermediate body of the land-wave along which the Dinornis may have travelled to New Zea- land has progressively subsided, and now lies beneath the Pacific Ocean."
When we determine and (which DIV treasures)

Authors', originally his life attained, researches Leila, originally productions some time, the 18th century, reached a second edition. But though he had much poetic taste, he was not fitted to be a poet or creative writer; and he was not long in finding out that his true destiny was to give to his country a series of works illustrative of historical and political history. The journeys he worked to prosecute researches in literary history and gossip. It was in the year 1790 that he published anonymously a little volume entitled 'Curiosities of Literature.' The success of this volume determined him to prosecute the work which he had there undertaken. Accordingly, with the exception of the volume of romance above alluded to, and we believe, one other anonymous publication, all Mr. D'Israeli's further productions during his long life consisted of the fruits of his labours. Some of the researches before mentioned were prosecuted partly in the British Museum, where he was a constant visitor at a time when the readers who had access to its treasures were not more than half-a-dozen daily; partly in his own library, which, especially in the end of his life (when he resided on his own manor of Bradenham in Buckinghamshire) was very extensive. The results of these researches were put forth from time to time either as additions to his 'Curiosities of Literature' (which thus eventually amounted to seven volumes) or in the separate publications of six volumes; or as independent publications. Among the independent publications may be mentioned his 'Essay on the Literary Character' originally published in 1790; his 'Quarrels of Authors, or Memoirs of Literary Controversy,' and his 'Intrigue into the Literary and Political Character of James the First.'—works originally published between 1812 and 1822, and since then published collectively under the title of 'Miscellanies of Literature,' and his 'Life and Reign of Charles the First,' published in five volumes in intervals between 1828 and 1831.

In acknowledgment of this last work he was made D.C.L. by the University of Oxford. He contemplated a 'Life of Princess Maria' also a 'History of the English Free-thinkers,' and had made notes for both as far as the optic nerve which attacked him in 1839 prevented him from executing either. With the assistance of his daughter he selected from his manuscripts three volumes, which were published in 1841 under the title of 'Amemities of Literature.' His last years were spent in revising and re-editing his former works, and he died in 1848 at the age of 82. "He was," says his son, from whose memoir, prefixed to a new and posthumous edition of his 'Curiosities of Literature,' where the following extracts are quoted, "an eminently delightful literary character, a man who really passed his life in his library. Even marriage produced no change in these habits: he rose to enter the chamber where he lived alone with his books, and at his chair lamp was ever lit within the same walls." He was born July 8, 1769, and he had been become rather corpulent.
for dissolution of marriage, he may at the same time claim damages from the adulterer, who must be made a respondent. The damages are ascertained by the verdict of a jury, the old action of crimen con, being abolished by the statute. The adulterer may also be condemned in the costs of the whole proceeding.

After the date of dissolution has been duly pronounced, either party is at liberty to contract a new marriage. Out of respect, however, to the religious scruples of a part of the community, clergyman of the established church are not compelled to solemnize marriages of persons who have been pronounced guilty of fornication. In case of a general refusal on the part of the clergy to celebrate marriages under such circumstances, parties so situated may of course marry with the other formalities by which that class of works are performed, and have them registered and held to be a refusal. By this combination of qualities he amassed a quantity of materials which nobody before him had ever supposed to exist, and he made such good use of them that a new work of the same nature, and his most important reference to Dobrentei's 'Nyevelűműfek,' which has become one of the principal monuments of Hungarian literature. How the revolution of 1848 affected him we have not seen stated, but it is well known that his friend and fellow-promoter of progress, Conni Stephan Steczeny, became a maniac, Dobrentei was still engaged in collecting materials for his great work when surprised by death on the 27th of March 1851, at the age of 66. He was the author of numerous lives of Hungarian worthies, both in the periodicals to which he contributed, and in the book 'New Hungarian Histories,' the first volume of which, a quarto volume, was published at Buda in 1835, and the fifth was in progress at the time of Dobrentei's death. His labours on this work were an outlet for the delight of his life, he pursued them with irrepresible ardour, and on the result his reputation rests securely. When he began, hardly anything was known of the history of the Magyar language for a thousand years; he, in his darkness he left enriched with light. He was indefatigable in discovering the existence of old correspondence or documents in family archives; when he had once discovered them, he was no less eager in obtaining permission to copy and make notes of them, and he never made a refusal.

DOBRENTZ, GABOR or GABRIEL, an Hungarian author and antiquary of distinguished merit, was born at Nagy-Szécsény, in the county of Vaspré, in 1768. He showed himself very early not only a remarkable zeal for the Hungarian language and literature, but a singular natural inclining for others in his views. At Osdenburg, a town not far within the frontier from Austria, and chiefly inhabited by Germans, he succeeded in getting up an Hungarian literary society, of which he became the secretary; and under his superintendence, which he discharged with industry and attention, it was published. At twenty he studied at Wittenberg and Leipzig, and in 1807 was recommended by Kázmery, then the almost acknowledged head of Hungarian literature, to the post of tutor to Count Louis Gyulai, a noble gentleman who, for years, had resided in a resident in that country. With the literary contributions of some of his Hungarian and Transylvanian friends, and the pecuniary contributions of the Transylvanian magnates, he set foot and edited a magazine, which was issued at Kázmery and the remaining nine at Pesth, after which it ceased for want of support; but it contained so many articles of interest that no Hungarian library is considered complete without it. In 1820 Dobrentei removed to Pesth (then, or rather, that of Hungarian capital, as he lived, in the occupation of several highly respectable official posts of a legal character, and in such constant literary activity that he became the acquaintance or friend of almost every person of any note connected with Hungarian literature. Indeed, almost all the information that has been put in circulation on that subject in England had its origin in Dobrentei. He was the friend and correspondent of Dr. now Sir John Bowring, to whom he supplied much of the information for his 'Progress,' and he also contributed to Miss Pardoe materials for her account of Hungarian literature and authors in her 'City of the Magyars,' and he wrote the article on the subject in the 'Leipsic Conversations-Lexikon,' which, by its being translated in Lieder's 'Encyclopedia,' and the Glasgow 'Popular Encyclopedia,' has become familiar to thousands of English readers. As a poetical writer, Dobrentei was not successful; his original poems appear to have been pleasing, and no more; and though his translation of Shakspere's 'Macbeth' was acted at Pesth in 1825, it did not receive such a welcome as to encourage the publication of his versions of the other masterpieces of Shakspere, which were reserved in Hungarian for the more successful pen of a lady, Emily Lecompton, who, in the time of the Academy, is the only translator of our great poet in any language. Dobrentei was more at home in his exertions to establish a 'Casino' at Pesth, an establishment of nearly the same kind as an English club of our own days, but borrowed both in plan and name from Italy, where it is made use of not only for the amusement of the society of the capital, but to enliven the dullness of the provincial towns. He was, after Conni Stephen Steczeny, the most influencial person in promoting this institution, and was for some years its secretary, but relinquished his post after three years' service, in the year 1831, of which he was also a zealous promoter. Kohl, the traveller, bears testimony to the extraordinary influence of these establishments on the whole tone of the Hungarian villages, where they have been imitated on a small scale. In 1837 Dobrentei received an intimation from the government that his holding the post of secretary to the Academy any longer would be incompatible with his official duties, and he then devoted himself to the editorship of his great work, the 'Rgvi Magyar Nyevelűműfek,' or 'Ancient Monuments of the Magyar Language,' the first
at Bergamo, in Northern Italy. He studied in the Lyceum of that town, and his father having originally destined him for the law, it was somewhat late before he commenced his musical studies. In 1827 he returned to his native town, and took the direction of the Musical Institute of Bergamo, of which Simone Mayer was then director. Here he remained three years, and in 1816 moved to Bologna, where his musical education was completed. He subsequently travelled with Mattielli, and on dispute with his father, entered into the army, and while in garrison with his regiment at Venice in 1818 produced his first opera, 'Ente di Borgo.' He continued to write for the theatre, and in 1822 left the army. His earliest pieces were not successful, and had been performed, and not till 1850, when he produced 'Anna Bolena' at Milan, that he began to take rank with the higher class of musical composers. In the course of these first twelve years of his career he composed twenty operas in all. On the fiftieth years from 1830 to 1844, when his last opera, 'Catarina Comnoro,' was performed, he produced 33 operas, of which several have sunk into oblivion, but others still retain their places on the stages of Italy, Germany, France, and England. Some are especial favourites, and frequently performed. Among these are the most fortunate productions may be mentioned 'Anna Bolena,' Milan, 1850; 'L'Elisa d'Amore,' Milan, 1832; 'Lucrèzia Borgia,' Milan, 1833; 'Marino Faliero,' Paris, 1838; 'Lucia di Samogna,' Naples, 1855; 'Le Prophètes,' Paris, 1841; 'La Fille Du Régiment,' Paris, 1840; 'La Joliesse,' Paris, 1840; 'Linda di Chamonix,' Vienna, 1842; 'Don Pasquale,' Paris, 1843; 'Maria di Rohan,' Vienna, 1843. Most of these later operas, besides his usual grace and facility, exhibit a strong tendency in the management of the moat and skill in instrumentation, much superior to his earlier productions. His artistic powers were thus manifestly improving and expanding towards the termination of his musical career. Soon after the performance of his 'Lucia,' which excited universal admiration, he was appointed Professor of Counterpoint in the Royal College of Music at Naples, and after the production of 'Linda' at Vienna, he was named chapel-master and composer to the imperial court. In 1845, while attending to the duties of mental and physical habits of intermission, began to show themselves, and he was for some time in a insanitary asylum. In October 1847 he was removed to his native town of Bergamo, where he died on the 8th of April 1848. (Nouvelles Biographies Générale.)

DONOSO CORTES, JUAN, an eminent Spanish statesman and author, was born in 1809, of wealthy parents, at the town of El Valle in Extremadura. He was so precocious that at the age of eleven he studied logic at Salamanca, and had commanded a host of political career before he was of age to enter on a legal one. A pamphlet however which he composed under the title of a 'Memoir on the Rights of Isabel the Second,' was suppressed by the advice of his friends as containing ideas so ultra-liberal as to be certain to offend. He was appointed in the same year to a post in the ministry of Grace and Justice, and in the next published his 'Considerations on Diplomacy and its Influence on the Political and Social State of Europe, from the time of the Revolution of July to that of the Quadruple Alliance.' In 1835 he was sent as a royal commissioner with General Rodil to bring back obedience to his native province of Extremadura, and acted with such success as to receive the grand cross of the Order of Charles III. He held a high official station; but dissatisfied with the turn that affairs had taken, he resigned his post, and for some time occupied himself in combating the party which supported the revolution of La Granja. He founded the newspaper 'El Piloto,' in which he was assisted by Alcalá Galvez, the great favourite of Queen Christina. In the 'Annuaire de Madrid,' a review or rather magazine established on the plan of the French 'Revue des Deux Mondes,' his first article was in which one of a series on 'Spain since 1833.' He delivered in 1837 at the Athenaeum of Madrid, a series of lectures on the influence of political principles on the arts. He was in France in 1840 at the time of the expulsion of Queen Christina, hastened to offer her his services on her arrival in that country, and is said to have been the author of the manifesto which she issued from Madrid to the Emperor of Spain. He returned to Madrid on a commission from her to defend her rights against Espartero, but his efforts were unsuccessful. He then returned to France and occupied himself with the composition of a 'History of the Minority of Queen Isabel II.,' passages of which were published in the 'Athenaeum' of Madrid in 1843. He subsequently returned to Spain. He was ambassador to Prussia at the time of the revolution in 1848, and afterwards ambassador to France, a country for which he always avowed a strong partiality. It was while holding that post, an ambassador extraordinary of Spain, that he married the marriage of Louis Napoleon with a Spanish consort, that he was seized with an attack of pericarditis, which carried him off, after about a month's illness, in the 3rd of May 1853, at Paris.

A. H. Downham. From his own criticisms and writings, 'Coleccion Elogica de los Escritos de Excentismos Señor Don Juan Donoso Cortes,' was published in two volumes at Madrid in 1848. It comprises none of his poetry but most of his political writings that we have mentioned, and several of his articles from the reviews, which seem to indicate those of the classical and Spanish taste. There is much that is as questionable on most of the subject on which he touchtes.

DOON. [AULDEN.] Institute of Agriculture, [Oxfordshire.] DORNDOH. [SUTHERLAND.] DOUBLEDAY, EDWARD, a naturalist of eminence, was born in 1810, and died in London in 1849. The family of Doubleday are honorably distinguished for their devotion to natural history. Edward Doubleday was the son of a musician and the elder brother of frontispiece. On his return from America he was appointed one of the curators of the British Museum. Large collections in this institution afforded him abundant materials for increasing his knowledge and developing his views of the structure of insects. The results he made known in a variety of papers, but more especially in his work 'On the Genera of Diurnal Lepidoptera.' This work, which was published in parts and left unfinished at the author's death, consisted of descriptions, with coloured figures, of great beauty and accuracy, of all the genera of butterflies. This family of insects was studied by Mr. Doubleday with the greatest industry, and his contributions to our knowledge of their forms are the most valuable of his labors. He devoted also considerable attention in publishing a work on this subject. He also contributed a paper 'On the Occurrence of Alligators in East Florida,' to the 'Zoologist.' A list of his papers will be found in the 'Aldine' volume of Agassiz's, 'Bibliographia Zoologica,' published by the Ray Society.

DOWNHAM. [NORFOLK.]
DRACONINA, a sub-family of Scansions belonging to the family Agamidae, the tribe Strobilosaur: and the sub-order Pachyglisora of Dr. J. E. Gray's arrangement. The family of Agama, or Agamidae, is thus defined by Dr. Gray—

"Teeth implanted on the end of the jaws. Tongue short, depressed, apex entire or slightly nicked. Eyelids convivnt, valvar. Feet, for walking. Toes all free, unequal; the thumb of the hind feet on the same plane as the other toes; the little toes lower down on the ankle than the thumb. The thumb is anterior and internal, and the great toe of the hind feet occupies the same position, the thigh and foot being bent forwards. This is proved by analogy, this toe being the only that is clawless in the Gekko, which have the clawless thumb, and in Ameis, where the thumb and great toes are simple, and not dilated beneath, like the other toes."

The synopsis of the genera of this family, according to the 'British Museum Catalogue,' is as follows:—

I. Body compressed. Living on trees.
      a. Ribs elongated, exerted, supporting wing-like lateral expansions. Throat with 3 pouches.
      1. Draco.—Ears naked. Nostril below the face-ridge.
      2. Dracoella.—Nostril above the face-ridge.
      3. Dracocei.—Ears covered with scales.
         b. Toe 4 or 5. Ears exposed.
   b. Sitana.—Males with an elongated porch. Females without any porch. Toe 5-5. Tail with elongated keeled scales beneath. Scales of back small, often with scattered larger ones.
      + Ears hidden under the skin.
      ↑↑ Ears exposed.
   10. Tarsia.—Scales of the belly keeled, of the back unequal. Eyebrows and parotids unarmed.
   11. Anomolepis.—Scales of the belly smooth, of the back equal. Eyebrows and parotids armed.
      *** Toe 5-5. Tail with broad rhombic keeled scales beneath. Scales of back uniform.
      *** Toe 5-5. Tail with truncated keeled scales beneath. Scales small, keeled, in cross rings.
   15. Callosoma.—Parotids swollen, armless. Throat lax. The nape and back with a low crest. Tail rather compressed. Face-ridge rounded, with small scales.
   16. Charassia.—Parotids swollen, with some spines above.
      The nape and back with a low crest. Tail tapering. Face-ridge distinct, with enlarged imbricated scales.
   17. Gindalia.—Parotids rather swollen, with 2 or 3 spines above. Nape and back not created. Tail tapering, round. Face-ridge indistinct.

B. Femoral pores distinct.
   18. Loparia.—Back and tail with a fin-like crest, supported by bony rays. Head squarish.
   19. Phrynomalus.—Back and tail with a crest of compressed scales. Head swollen behind.

   a. Neck with a frill-like expansion on each side.
   20. Chlamydosora.—Head rhombic.
      ** Neck simple.
   25. Gramnatophora.—Back not crested, with cross rows of larger scales. Femoral pores numerous.

      * Pre-anal and abdominal pores in several rows.
   27. Stellos.—Tail with rings of large spinose scales. Parotids spinose.
      ** Pre-anal pores in a single line. Abdomen poreless.
   29. Trapelus.—Parotids unarmed. Scales minute. [Agama]
   b. Pre-anal and femoral pores none.
      * Ears exposed. Body and limbs with large spinose tubercles.
   30. Moloch.—Neck with a convex tubercle above.
   32. Megalochila.—Angle of mouth fringed. Toes fringed on the sides.
   33. Uromastyx.—Tail broad, depressed, with complete rings of spinose scales.
   34. Saura.—Tail broad, depressed, with scales of the upper part of the rings spinose; of lower, armless.
   35. Leiolopia.—Tail round, elongate, tapering, with whorls of smooth scales.

The genera and species of the family Draconina are as follows:

1. Draco.—Head small. Nostril in a scale, rather tubular on the side of the face-ridge. Tympanum deep, but the ear visible, opaque, white. They live on trees, walking with agility with their wings folded on their sides, but they expand them and use them as a parachute when they throw themselves from the tops of trees. They spread out their pouches as they lie on the trunks of the trees. Scales unequal, some larger, keeled. Nape created. For skeleton of Draco, see Dragam.
   a. Coliana, Linn., the Flying Lizard. It is the D. major of Lamarck, D. Halli in Dana, D. Bourdinneria of Lesson, and the D. Daudini of Dumfri. The scales of the back are rather broad, generally smooth; of the throat granular, of the same size; the lateral pouches of the males moderate, rounded at the end, covered with oval keeled scales: the throat black-spotted; wings gray, fulvous, or brown, spotted and marked with black, sometimes forming four or five oblique black bands near the outer edge; the sides with a series of large broad keeled scales.
   b. Eunectes, the Timor Flying Lizard. It is the D. exicrce Timorinserter of Schlegel. It has flat scales, rather large, smooth, unequal, with a row of rather keeled scales upon and on each side of the vertebral line; wings reddish, brown-spotted; lateral pouches (of male) moderate, rounded at the end, covered with large keeled scales; sides with an interrupted series of large keeled scales.
   c. Drimobius, Kuhl, the Fringed Flying Lizard. Scales of the back small, equal, mostly smooth; the throat with many circular spaces, covered with large granular scales; head...
white, brown-netted; lateral pouches of male elongate, angular, setae, covered with large keeled scales; wings with short whitish longitudinal lines; sides with a series of small triangular keeled scales, placed in groups of two or three; nostrils sub-superior. For figure of Draco fimbrinata, see D Tipo.

2. Dracocela.—Head small, covered with small unequal scales; the nostril roundish, in a scale, erect, vertical on the face-ridge; tympanum exposed, and opaque.

* Nape crested.

D. Dusunieri, Dusunier's Dragon, has moderate scales, rather rhombic; the sides with a series of rather larger scales, placed in roundish, small groups; with a small boy point at back and front angle; wings with large brown spots near the body, and largely marbled near the outer edge; a black band across the throat; base of the ponch blue-black; the limbs moderate.

** Nape not crested.

D. Narcrastopen, the Red-Throated Dragon. The orbit with a small bony point above, upon the front and back edge; scales of the back equal, smooth, the sides with a series of keeled scales; nape not crested; a large round black spot on each side of the base of the position; wings brown-netted, without an elongate.

3. Dracocactus.—Head quadrangular, covered with small unequal scales; nostrils lateral, on the face-ridge; tympanum hid under the skin, covered with scales. Weigmann described this species as having but five exserted ribs, but the specimens in the British Museum, like the other dragons, have six on each side.

* Nape not crested, with a longitudinal fold.

D. quinquedactilus, the Banded Flying-Lizard. Wings with five cross bands; scales of the back keeled; nape with a longitudinal fold, not crested; nostrils superior, erect; ears covered with small equal granular scales.

** Nape not crested. Ears slightly concave.

D. lineatus, the Lined Flying-Lizard. Head gray, white-spotted; wings dark-banded, with small white longitudinal lines; the sides and throat bluish-black, with large white spots; the ears indistinctly marked, covered with three flat scales; base of the tail rounder above, with a slight crest on each side.

D. ornatus, the Banded-Head Dragon. Gray; head black, cross-banded; chin black, dotted; wings gray, reticulated with black, and with broad black bands at the edge; scales rhombic, of the middle of the back larger, keeled; of the sides smaller, smooth; ears covered with small equal granular scales; tail slender, compressed, with five keels above and two stronger keels beneath, rather depreased at the base, with five small eyes.

D. maculatus, the Spotted-Winged Dragon. Gray; black-spotted; wings black-spotted; throat gray; pouch of the male elongate; scales of the back rather unequal, rhombic, keeled, of the sides rather smaller; sides with a series of large keeled scales; ears rather sunk, with unequal flat and scales; tail slender, with a central keel above and five more small ones on the sides; base dilated, with five nearly equidistant keels above.

D. ephippinum, Weigmann's Flying-Lizard. Wings reddish near the body, with large brown spots, yellow near the edge; throat yellow, black-spotted. This may be the same as the former species, but the wings are subelliptic, and the scales do not exactly agree.

D. D. [CALLIOPE.]

DRAKEA, a genus of plants belonging to the natural order Orchidaceae. D. elastica has a single flower placed at the end of a slender smooth shoot from 15 to 16 inches long, and its labellum, which is hammer-headed and black, is long and narrow, on a long arm with a moveable elbow-joint in the middle, is stated by Mr. Drummond to resemble an insect suspended in the air and moving with every breeze.

DRAKE. [Minn.,]

DROF. [DRAKE.] DROZ, FRANCOIS-XAVIER-JOSEPH, was born at Beasopon on the 31st of October, 1773. Having visited Paris for a few months in 1792 he witnessed the massacre of September 17, after which he returned to Germany, and enlisted as a volunteer during the national enrolments. His comrades, according to the fashion of the times, elected him as their captain. But after a short service of little better than three years, he quitted the army for ever in 1796, and devoted the rest of his life to study. About the same time he obtained by his family influence the appointment of Professor of Belles Lettres to a public school in his native town; and in 1799 he published his 'Essai sur l'Art Graphique.

In 1802 his school having been suppressed, he went to Paris, where he settled definitively, and became connected with Villemin, Cabanis, and all the leading litterati of the time. By the advice of Cabanis, he published his 'Idees,' a work of fiction in 1804, to attract attention to his profession. In 1806 he published his 'Essai sur l'Art d'Etre Heureux,' which was followed by an 'Eloge de M. de Maistre,' in 1811, for which a medal was awarded to him. From 1816 to 1830 he wrote for several newspapers, inculcating the views of his system, and the principles of moral education from politics. He then joined Picard in writing his 'Memoire de Jacques Favel,' a name imitation of the then fashionable; he wrote under the name of 'De la Philosophie des Systèmes.' The same year as 1806 he was elected a member of the French Academy.

He had long desired to hold a professorship, and at length in 1832 he was appointed to lecture, by authority, at the medical college, where he had previously lectured. In 1839 he published his best work, 'L'Histoire du Règne de Louis XVI.' His gentle and unambitious life came to a close on the 6th of November, 1850, when he died as peaceably as he had lived.

Although his works are written in a very unpretending style, they are written from the heart, and it is probable that all the principal critics of his country have mentioned them with esteem.

DUC-K.-WREED. [LUMDA.]

DUGPINEOYSIS, a mineral, consisting of an arsenate and sulphuret of lead. It occurs in cedrelahedram of a dark steel-gray colour in the Dolomite of St. Gothard. The specific gravity is 4.55.

DULWICH COLLEGE. Under ALLANY, WILLIAM, in the 'Penny Cyclopedia,' vol. I., p. 347, an account was given of the college of his institution. As the value of the property with which he had endowed it had enormously increased, it had been long felt that the income was no longer employed in accordance with the donor's intentions, and an Act was therefore passed, 20 & 21 Vict. c. 64, for its better management.

According to this Act, the educational branch of the college is very largely extended; two schools are established, an upper and a lower school, in which the classical and modern languages, mathematics, and natural sciences, are taught. The school of mathematics, physics, chemistry, civil engineering, and other departments of knowledge are to be taught to daily scholars, on the payment of a small fee, with no limit to the number except the amount of funds. The school of natural sciences is made more accessible by the number of boys, to be elected by competition (at present not to exceed twenty-four, but to be increased when there are sufficient funds), are to be foundation scholars, to be provided with board and lodgings free; and there are eight exhibitions in the upper school for boys of the upper school, tenable for five years while studying an English university or for a profession; and twelve of 40L. for boys of the lower school, tenable for four years for the like purposes.

The life interests of the present master, warden, fellows, and poor brothers and sisters are provided for; but for the future management nineteen governors are to be chosen; namely, two each to be elected by the four parishes of St. Saviour's, St. George's, St. John's, and St. Mary's, respectively; two of the same parishes, respectively; two of the parishes of St. James's, Middlesex; and St. Botolph, Bishopsgate, to hold office for seven years; and the remaining eleven to be appointed by the Court of Chancery, without any other restriction than that one must be resident in Dulwich. There is to be an upper and a lower master of the upper school, a tutor of the upper school, and a school chaplain, and an organ for the chapel, which is to be maintained as a place of worship for Dulwich. The net income of the college is to be divided into four equal parts: three to be devoted to the education of the poor, and the remaining fourth to the support of aged men and women, and present (1858) not to exceed twenty-four, and to be chosen in equal proportions from the four parishes above named.

Provision is also made for the maintenance and presentation of these school scholarships; but the income arising from this fund, it is to be applied in providing instruction in drawing and designing for such of the boys in the two schools as evince an inclination and capability for their acquisition.
DUM-B-CANE. [Cabarau, S.1.] DUMBLENE. [Prestgibourne.]

DUNDAS. [Canada, S.2.]

DUNMANWAY, Cork, Ireland, a market-town and the seat of a Poor-Law Union, is beautifully situated on the river Bann, near its bend, to the west of the town of Banbridge, 23 miles S.W. from Cork, 190 miles S.W. from Dublin. The population in 1851 was 2222. Dunmanway Poor-Law Union comprises 15 electoral divisions, with an area of 373 square miles, and a population in 1851 of 17,917.

The town is situated on level ground almost entirely surrounded by lofty and rugged hills. The greater part of the town was built by Sir Richard Fox, who also obtained for it a charter as a market-town. There are two churches for Episcopalians, viz., an old one, and an octagonal chapel, and a district Bridewell. A Charter school was endowed by Sir Richard Fox. The market is held weekly; fairs are held in May, July, September, and October.

DU NSE. [Benwickshire.]

DU PERRE, VICTOR GUY, a baron of the empire and a French naval officer, was born at La Rochelle on the 20th of February, 1775. He commenced his maritime career in the merchant navy, and entered the French service as a midshipman. He afterwards returned to France after a voyage of eighteen months; and on his having broken out, he entered the republican service in 1795. During the next ten years he took part in many single-ship fights with the English, until he was promoted to the staff on board the Veteran, commanded by Th. D. D'Arbois. In the month of September, 1806, he became captain, and took the command of the Sirène frigate. In March, 1808, whilst off the coast of Bretagne, in company with the Italiensch, Duperre was chased by two ships and three frigates, and whilst making for the port of Bayona, was taken possession of by the enemy. He was detained for an hour and twenty minutes an unequal combat with two of the enemy's ships, keeping up a constant fire from one to the other. Though repeatedly summoned to surrender, he contrived to bring off his frigate; and it is related that at this time it was suggested to the Emperor Napoleon, who had been his patron, to appoint him as the rank of ship captain. He performed several brilliant exploits in the Indian Ocean in 1808 and 1809, after which he became a baron of the empire and consul-general. An August 20, 1810. In December, 1812, he was appointed to command the French squadron lying before Cadiz, and contributed to the capture of that city. In 1816 he became commander in chief of the combined fleet in the Antilles.

DU PERRE was summoned to Paris in February by the government of Charles X. to be consulted respecting the meditated expedition against Algiers. In his reply, Duperre represented the undertaking as extremely perilous and uncertain. It was in spite of his representations that it was resolved upon, and he was then dismissed to the council of the minister, who had refused to confide to him. This fleet set sail on the 20th of May, 1830. It consisted of 103 ships of war, and 257 vessels belonging to the merchant service, and other craft, the whole having on board from 30,000 to 40,000 men. After encountering many difficulties from the nature of the coast and contrary winds, Duperre appeared before the batteries of Algiers on the morning of the 13th of June. The signal share taken by Duperre in the siege and capture of this formidable fort, included Charles X. to raise the siege, July 14th, 1830, a few days before his own fall. This appointment was revoked by the government of July; but on the 13th of August, 1830, the same government made him an admiral, and restored his pension. He became minister of the naval department, and acted as minister of commerce, and was afterwards reappointed to the same office under different administrations. He resigned this office on account of declining health, February 7, 1843, and died November 8, 1846.

DUTCHEM, WILHELM LOUIS, a naturalized American, was born in Neubourg, department I'Eure, on the 27th of February 1767. He was an advocate, practising in Namur, when the revolution began in 1789. In 1793 he is said to have been elected a deputy to the new chamber. During the governments of Louis XVI. and Napoleon, he was allowed to spend his time as he pleased, but without the peremptory demand of his society he had at first adopted of constitutional reform, and on more than one critical occasion took the lead of the liberal party.

After the revolution of July 1830, Dupont de l'Eure became a commissioner of the law in the provisional government, in his own department, and soon after, yielding to the entreaties of Lafitte, he accepted the office of Minister of Justice; but his principles and want of flexibility were suited neither to the government nor to his colleagues, so that he resigned his portfolio on the 27th of December, 1830, and resumed his place in the ranks of the opposition. After the fall of Louis Philippe in February 1848, Dupont de l'Eure became, against his own wish, a member of the provisional government. He wasoral minister in the Jacobin ministry, but by no means a violent republican, he was generally respected as a consistent and honest politician.

DUTENS, JOSEPH-MICHEL, the son of Michel-D'Arc, a French botanist, who was born at Bordeaux on the 21st of May, 1749. His early education was entered when eighteen at the Ecole des Poes et Chausseurs, and at twenty-two years of age he left it with the brevet of engineer. In 1800 he printed his first work at Evreux. "Des Moyens de naturaliser l'Instruction et la Doctrine," and in the same year published a topographical description of the arrondissement of Louviers, in the department of Eure. In 1804 he gave to the world his first work on political economy, an analytical exposition of its fundamental principles. In 1819 he was commissioned by the government to travel in England and France to examine the canal system there, and he extended his labours to all the great commercial works of the country, the results of which were published at Paris in 1819 in "Memoirs on the Public Works of England and France." This work is divided into two parts; the first is devoted to engineering, describing the canals, the works of art employed in their construction, the cost of making, the expense of maintaining, and the system of working; the second is principally to develop the mode of working in England and France. A third part of what should be the principal branches, and discussing the financial condition which would ensure its success. In 1835 Dutens published his greatest work, the 'Philosophy of Political Economy;, or a new Exposition of the Principles of Social Science, which was an expansion with considerable modifications of his previous work, and occasioned much opposition from the economists of the school of Adam Smith. Blanqui says, "It is only a new edition of the doctrines of Quesnas; but with less of advancement in respect to different points;" a criticism occasioned M. Dutens to publish in 1837 a defends of his work, and a second in 1839; and the contest was still going on when the Académie des Sciences elected him a member of their body. He then published his 'Essai comparatif sur la formation et la distribution du Revenu de la France en 1815 et 1836,' a work which contains the best statistical account of the productive riches of France, and has received and deserves high praise. In his last issued work, 'Des pretendues erreurs dans lesquelles, un jugement des modernes économistes, renfou les anciens économistes relativement au principe de la richesse nationale,' in which he defends the theory of Quesnas, Turgot, and their followers, that manufactures and commerce do not contribute to the wealth of a country, is said to have been written after the revolution of 1848. (Nouvelle Biographie Générale.)

DUTROCHET, BERNARD THIERY-HENRI, a distinguished French botanist and natural philosopher. He was born at the Château de Néot, Poitou, on the 14th of November 1776, and died at Paris on the 4th of February 1847. He was the son of a military officer, who emigrated, and his father died in a state of destitution. Dutrochet entered in 1797 entered as a private the military marine, but afterwards deserted. In 1802 he commenced at Paris the study of medicine. He made a brilliant career as a student, was awarded the prize of the Faculty of Medicine in 1806, and was appointed physician to Joseph Bonaparte, king of Spain. He afterwards practised at Bordeaux, and was appointed physician to Joseph Bonaparte, king of Spain. He became principal physician to the Hospital of Burgos, which was then devastated with typhus. He displayed here great energy and
abill. In 1809 he returned to France, and gave himself up to the study of natural science, for which his education fitted him. The tendency of Dufrocq's mind was to develop the laws which regulated the existence of organic beings, and many of his researches have had a permanent influence on the development of the departments of science to which they relate. His name is best known to physiologists from his researches on the passages of fluids through animal and vegetable membranes. The laws which he observed to regulate these phenomena he applied to the explanation of the functions of absorption and excretion in the animal and vegetable body. The passage of a fluid from without inwards he called 'endosmosis,' and the passage from within outwards 'exosmosis.' His views on this subject were published in a work which appeared both in London and Paris in 1828, with the title 'Nouvelles recherches sur l'Endosmosis et l'Exosmosis,' suivies de l'application experimentale de ces actions physiques à la solution du probleme de l'irritabilite vegetale et à la determination de la cause de l'ascension des lieges, de la descente des racines.' The phenomena comprehended under the terms endosmosis and exosmosis were rightly described by Dufrocq, but he was hasty in tracing their cause to electricity, and failed to see that they were parts of a much more general set of phenomena than he had described. His other papers are very numerous, and were on medical subjects not immediately related. Thus we find his inquiries embraced amongst other things the following subjects: a New Theory of Voice; a New Theory of Harmony; on the Family of Wheel-Animalcules; History of the Egg of the Bird; on the Envelopes of the Fossils; Researches on the Metamorphosis of the Alimentary Canal in Insects; on the Structure and Reproduction of Feathers; on the Height of the Meteor which projected Aerolites at Charonneville in 1811; on the Growth and Reproduction of Plants; on the Special Directions taken by certain parts of the Plants. The results of all his labours and a connected view of the subjects to which he devoted his attention, he gave in a volume entitled 'Memoires pour servir a l'Histoire Anatomique et Physiologique des Vegetaux et des Animaux.'

DUVERNOY, GEORGES-LOUIS, a distinguished anatomist and zoologist. He was born at Montbéliard, then a dependency of the duchy of Wurtemberg, now an arrondissement in the department of Doubs in France, on the 6th of August, 1777, and died at Paris on the 1st of March, 1865. His father practised as a physician at Montbéliard, and he was brought up to the same profession. He commenced his studies at Stuttgart in 1792; but the principality of Montbéliard having been ceded to the French in 1793, he was compelled to finish his studies at Strasbourg. He subsequently went to Paris, where he graduated in 1801. In 1802 he was associated with M. C. Duménil in reporting the lectures of Georges Cuvier, then in the zenith of his reputation. The "Leçons d'Anatomie comparée" were concluded and published in 1803. On the completion of this labour he married, and, as natural science afforded him little hope of support for a family, he retired to his native town to practise his profession. In 1806 he was recalled to Paris, and named by De Fontames joint professor of zoology in the faculty of science. Again, however, he returned to practice his profession in Montbéliard, and for nearly twenty years this distinguished zoologist pursued its harassing and laborious duties. In 1827 the chair of natural history in the faculty of science in Strasbourg was offered him: this he accepted; and from this time to his death we find him pursuing with unwavering industry zoological researches. In 1837 he was offered the chair of natural history in the College of France, vacated by the death of his great master, Cuvier. This chair he accepted, and held till 1850, when the death of De Blainville having created a vacancy in the chair of comparative anatomy he was appointed to it, and held it for four years. Duvernoy's contributions to zoological science are extremely numerous. In his writings and lectures he was more remarkable for the accuracy and extent of his knowledge than for the novelty and originality of his views. He was an industrious compiler, and was an extensive contributor to the 'Dictionnaire des Sciences Naturelles,' and also to the 'Dictionnaire Universelle d'Histoire Naturelle.'

DYNASTES, a genus of Coleoptera insects belonging to the section Pentamera, sub-section Lamellicornis, and family Dynastidae of M'Cleay. The species have the body very large and thick, the outer edge of the jaws serrated or toothed, and the lower jaws cornose and toothed. The genus Dynastes embraces the largest and most robust forms of the insect kingdom. They are nevertheless quite harmless. None of the species are found in this country, and only one in France. The largest forms are found in the tropical parts of India and South America. The habits of these insects are much the same wherever they are found. They bury themselves by day in holes in the ground, or in the decaying trunks of trees. At night they are seen flying about the trees. The females are more numerous than the males, and do not possess the horns, which give the males so remarkable an appearance. The more remarkable species of this genus are the Elephant and Hercules Beetles. The latter is of a glossy black color. In the males the thorax is developed into a thick and curved horn, which is bent downwards at the tip, and a similar horn projects from below which points upwards, so as to come in contact with the former. The entire length of this be-tie is 6 inches.

DYSART. [Firearms.]

DYSCLASITE, a Mineral consisting of hydromel siliicate of lime. It occurs in white fibrous masses, consisting of delicate fibres of a whitish or yellowish or bluish color. It has a hardness of 4½, and a specific gravity of from 2.28 to 2.36. It is easily galvanised in hydrochloric acid. It is found in the trap of the Faroe Islands. A variety called Olenite is from Greenland.

DYSDERA, a genus of Spiders. The species have 6 eyes, placed in a curve resembling a horse-shoe open in front; the mouth-caws very large, and produced in front; the maxillae strait, and dilated at the place of insertion of the palpi. The type of the genus is D. erythrina, which is not an uncommon species in Great Britain. It is mostly found under stones.

DYSODIL. [Coal, S. 2.]

DYSULITE. [Mineralogy, S.1.]
EARTH-WORM. [ANNEKLAU.]
EASINGWOLD. [YORKSHIRE.]
EAST INDIES. [INDIAN EMPIRE, S. 2.]
EASTBOURNE. [SUSSEX.]
EDELMEYER, JACQUES-JOSEPH, French chemist, was born July 10, 1814, at Aix-en-Provence, in France. Having passed successively through the colleges Henri IV. and Beaussac, he in 1831 entered the Ecole Polytechnique, and in 1833 passed from it to the Ecole des Mines. His ability and industry procured him, in 1835, the appointment of assistant, and in 1845 chief professor of analysis at the Ecole des Mines; in 1841 he was made one of the secretaries of the 'Annales des Mines,' and experimental chemist at the Ecole Polytechnique. A wider field was however opened before him by the appointment in 1847 of director of the Manufacture-Royale of Sèvres. To the duties of this office he applied all his energies. New and improved modes of operation, and the latest chemical discoveries, were employed with a view to economise the cost and improve the quality of the manufacture, while the most able designers and painters were called in for the purposes of obtaining the best models and the richest ornamentation; and under his direction the porcelain of Sèvres acquired a reputation fully equal to that of Sevres, while the establishment was regarded as a model for the conduct of its arrangements.

M. Ebelmen was a member of the commission sent by the French government in 1851 to the Great Exhibition, London. In the beginning of March 1852 M. Ebelmen was named examiner-chief of the mines, but he survived the appointment only a few days, dying on the 31st of March, 1852, in his thirty-eighth year.

Ebelmen was regarded with great hope for his combination of sound and minute scientific knowledge with practical abilities. He was a member of the Academy of Sciences, and his early death was generally regretted. He contributed a great many papers to the 'Annales des Mines,' the 'Annales de Physique et de Chimie,' and the 'Bulletins de l'Academie des Sciences.' Among the more important were: 'Sur la composition des carbes, and its employment in metallic manufactures;' and several upon the composition of rocks, the artificial reproduction of mine ashes, &c., of which we may note.—Sur les Produits de la Decomposition des espèces de minerais et leur composition, 1845; Sur une Nouvelle Méthode pour obtenir des Combinations Cristallines par la voie sèche, et sur ses applications à la reproduction des espèces Minérales, 1847; Sur la Decomposition des Roches, 1849, and particularly 'Sur les Altersations de la Végétation sous l'Induction des agents atmosphériques et des eaux d'infiltration,' 1851. The more important of his 'Mémoires' have been collected and published under the care of M. Salvetti with the title of 'Recueil des travaux scientifiques de M. Ebelmen,' 2 vols. 8vo, Paris, 1856. (M. Chevreul, Notice sur M. Ebelmen; Nouvelle Biographie Générale.)

ECCLESIASTICAL COMMISSIONERS. The Ecclesiastical Commissioners are a body corporate, created by the statute 6 & 7 Will. IV. c. 77, for certain purposes and with certain powers therein named. The great inequalities in the extent and income of the dioceses of England and Wales, in the duties and receipts of the cathedral and collegiate bodies, and in the extent of parishes and the annual value of the benefices of the Church of England, after long and angry comments gave rise in 1836 to the issue of two commissions, directing the persons named therein to consider the state of the dioceses with reference to the amount of their revenues, and the more equal distribution of episcopal duties; and of the several cathedral and collegiate churches, with a view to the suggestion of such measures as might render them more efficacious to the objects of the Established Church; and further, to devise the best mode of providing for the care of souls with special reference to the residence of the clergy on their respective benefices. These commissioners made four reports, recommending various alterations, and the appointment of permanent commissioners, for the purpose of preparing and laying before the sovereign in council such schemes as should appear to them to be best adapted for carrying those recommendations into effect; the Crown being empowered to make orders ratifying such schemes, having the full force of law. The statute above mentioned was passed in consequence; and under its provisions a great many beneficial alterations have been made and are being effected. The recommendations contained in the four reports of the original commissioners have also been carried out, with certain modifications and amendments, to which the sanction of Parliaments was required and obtained (see 1 & 2 Vict. c. 38, 106, 108; 2 & 3 Vict. c. 194; 3 & 4 Vict. c. 113; 4 & 5 Vict. c. 39; 6 & 7 Vict. c. 77; 10 & 11 Vict. c. 98, 108; 13 & 14 Vict. c. 41; 16 & 17 Vict. c. 60). The chief features of the alterations thus effected are the equalisation of the territorial extent of the dioceses, the creation of the new sees of Ripon and Manchester, and the union of the sees of Gloucester and Bristol. The revenues of the sees have also been equalised, by augmenting the income of the smaller out of the revenues of the larger. Cathedral and collegiate bodies have also been regulated. The powers and constitution of the Ecclesiastical Commissioners have been amended by the stat. 3 & 4 Vict. c. 113, s. 78; and by the appointment of Church Estates Commissioners, who are commissioners in the Ecclesiastical Court of the United Kingdom, by the ecclesiastical members of the Ecclesiastical Commission (13 & 14 Vict. c. 14; 14 & 15 Vict. c. 77). The Ecclesiastical Commissioners are the only body of persons permitted to exercise any power over the clergy of the Established Church or over the property of those clergy; and, lastly, by the transfer to them of the powers of the Church-Building Commissioners.

ECCLESIASTICAL COURTS. Until recently the Ecclesiastical Courts, in addition to their merely spiritual functions, had cognisance of three kinds of civil cases, namely, causes pecuniary, causes matrimonial, and causes testamentary.

The first of these heads included matters relating to the non-payment of tithes, many of ecclesiastical dues and fees, and also matters of spoliation, dilapidation, and neglect of repairing the church and things thereto belonging. The statutes under which the tithes have been commuted and replaced by rent-charges, recoverable by distress like other rent-charges, have virtually abolished suits for tithes in the Courts Christian, and their jurisdiction in other causes pecuniary has thus been in other ways reduced to a very small compass. The statute 20 & 21 Vict. c. 89 has entirely abolished the jurisdiction of these Courts in cases matrimonial (Divorces, S. 2). The privilege of granting marriage licences being alone preserved to them. And the Act of the same session (20 & 21 Vict. c. 77) has transferred their jurisdiction in cases testamentary to a Civil Court, proceeding according to the course of the Common Law. The clauses of the statute 21 Geo. III. c. 100, emended by 22 Gra. II. c. 28, relate to the dividing of lands held in tail, and the partition of such lands, and the distribution of the estates of intestates. To these clauses Title 3 of the statute 1 Geo. IV. extends the words 'and in all cases where the death of any person shall give a right to any person to call for an administration of his estate, or to recover from any person any part of the estate of such deceased person.'

 Việc bị cắt:

ECHELON (or French Echelons). A genus of fishes belonging to the section of Sub-Brachial Muscles, corals, and the family Echeloniidae. The body is elongated, covered with very small scales; a single dorsal fin placed opposite the anal; the head very flat, covered with an oval disc formed by numerous transverse cartilaginous plates, the edges of which are directed backward; the mouth wide, with numerous small recurved teeth on both jaws, the tongue, and the vomer. (Yarrell.)

The species of this genus are not numerous. Cuvier enumerates four; and another has been described from the west Indies. They are all easily recognised by the peculiar adhesive disc on the top of the head, by means of which they attach themselves to other fishes, the bottoms of vessels, or other objects floating in the sea. The object of this contrivance is not very well ascertained.

E. remora, the Common Remora, or Sucking-Fish, is found in the Mediterranean Sea, and was known to the Greeks and Romans. Dr. Terton once took a specimen of this species riding on a cod-fish in Swansons Bay. The following is Mr. Yarrell's description of it: 'The disc of the adhesive apparatus in the specimen now described, with seventeen transverse lamines, was one-third of the whole length of the fish, not including the caudal rays, the breadth one inch and one-quarter. The mouth is free, flexible, and of considerable breadth, to secure perfect contact with the surface to which it is opposed; the parallel
laminae are represented as only slightly elevated: the degree of adhesion is in proportion to the power used to raise the lamina, and the direction of the rise is in a direction perpendicular to the plane of contact. * * * * The vertical direction of the moveable lamina is effected by sets of muscles going off obliquely right and left from two elongated bony processes, one on each half of each of these moveable divisions. The contraction of these muscles acting upon these levers, raises the external edges of the parallel divisions, increasing the area of the vacuum; and it will be observed that the points of the moveable transverse divisions to which the edges of the body are attached, are the farther than the outer edge, by which the chance of interfering with the perfect continuity of the free margin, and thereby destroying the vacuum, is diminished. All the bony laminae, the outer edges of which are united with some of the teeth, are, on the contrary, moved simultaneously, like the thin vertical divisions of our common window-blinds, by means of the mechanical contrivance on the framework. The longer muscles placed nearer the outer oval edge are probably instrumental in preserving the contact of the more flexible margin, and the serrated external edges of the parallel laminae help to preserve the degree of elevation obtained: the adhesive power as before observed, is in proportion to the area of contact to the volume of the body treated.

ECHIVERIA, a genus of Plants named after M. Echiveri, author of the 'Flora Mexicana.' It belongs to the order Crossales. It has a 5-parted calyx, the sepal s erect, united at the base. Petals united at the base, erect, three at the base, the middle one lower, nearly serrated at the base, acute. Stamens 10, shorter than the petals, and adnate to them at the base. Scales 5, short, obtuse. Carpels 5, ending each in a satulate style. The species are succulent shrubs, natives of Mexico. None of the species are native in the arts or medicine, but their handsome leaves and showy flowers give them a place in every collection of plants. The genus is closely allied to Sedum, and many of the species resemble that genus.

ECHIODOIDES is a genus of Apical Malaconogryphus Fishes belonging to the family Muraenidae. The head is oval; jaws furnished with large cylindrical teeth in front; other smaller teeth on the palatal bones and on the vomers. Gill-apertures large; branchiostegous membranes with seven rays. Body smooth, without scales, elongated, compressed. Dorsal and anal fins nearly as long as the body; all the rays soft; no ventral fins; anal aperture near the head. This genus was constituted to receive a very remarkable fish (E. Bavaricus) found in the Danube at Capua, in the province of Avellino, near Glenarm, in the county of Antrim, Ireland. It was described by the late Mr. W. Thompson in part ii. vol. ii. of the 'Transactions of the Zoological Society.' This fish resembles the infamous charaxes, and Mr. Thompson had some difficulty in determining the total length of the fish was 11 inches. As Dr. Drummond's specimen is the only one on record, nothing is known of the habits of the fish.

ECHYMOTERES (Fitsinger), a genus of Sciuere belonging to the family of the Laamiiidea. It possesses the teeth and pores of the genus Polychrus, but with small scales on the body only. The tail, which is large, has great scales, which are rhombic and crenated. The head is 4-sided, and covered with small plates. The form of a little short and fat-tailed, like that of some of the Agonyl, rather than like the slender shape of Polychrus. There are four species—E. Fitsingeri and E. anulatus, natives of Brazil; E. obtusirratis, native of Mexico; and E. cucullotis, a native of Brazil.

ECTOZOA (from ecto, without, and bodi, living), animals found living upon the external parts of other animals. This term is applied to distinguish the forms of animal life which are parasitic upon the parts of an animal and not from that animal which inhabit their interior. [Ectozoa.] Whilst those which inhabit the interior of animals have so much resemblance to each other that naturalists place them together in an order which they do not feel to be a separate Order; those which are found on the surface are very dissimilar, and belong to different and similar families. The term Ectozoze is therefore not one expressing any affinity between the animals included in it, but simply refers to their habitation.

The Ectozoze as well as Ectozoa are found frequently associated with the diseased states of the animal bodies on which they are found, and much discussion has arisen as to whether

there is the true cause of the diseases which they accompany. Too much is certainly true, that when they originate from the diseased state of the body on which they are found, when allowed to increase they become themselves a source of diseased conditions, which disappear as soon as they are destroyed.

The general law equally applicable to parasitic plants as well as to animals. So that it would appear that, although their first attacks may be invited by a diseased condition of the plant or animal on which they are found, they may be productive of destructive effects by an unnatural and unholy influence, and may become the source of destruction by the attacks of other animals. Under the term Ectozoa a number of animals have been placed together whose claims to be regarded as sections of the great family Cestodes are now generally recognized. These are found more especially on the bodies of fish, infesting their skin, eyes, and gills. They are very numerous, and the larger number of them belong to the family Lenormand. [Lenormand.] They must be regarded as the Ectozoa of aquatic animals. The bodies of the Cestozoa are frequently the chosen residence of many species of Curripedia. [Cirripedia.]

Land animals are subject to the attacks of various forms of Ectozoa, more especially those belonging to the Articulate tribes of animals. The following is a list of the creatures to which man is subject in various parts of the world.

Pediculus canis (Dog's Flea), the Crab-Louse; Pediculus Ovatus (Nitsch), Head-Louse; Pediculus Vesticum (Nitsch), Body-Louse; Pediculus Tectosum, Bed-Mite (Anoplura, S. 2); Sarcoptes Scabiei (Linn.), Itch-Insect [Acari], Dermanyssus Boty (Gervais), Louse American; Dermanyssus granulosus (Linn.), Argentine; Dermanyssus penetrans (Gennel), Chigoe; Pulce irritans (Linn.), Common Flea [Pulex]; Omea lenticularis (Linn.), Bed-Fug [Boo]; [Omea hominis (Say), Gaq-Fly [Bom].

Other creatures are occasionally found taking possession of the surface of the human body. In diseased conditions the common fly has been known to deposit its ova in various parts of the body, and many of the insects which are parasitic upon the lower animals will take up their abode on the diseased parts of man. Thus Anopheles, a mosquito which is peculiar to America, and is the species of animal on which they are found, so also with the species of the genera Pulce and Omea.


EDGECOMBE. MARIA, the daughter of Richard Lovell Edgeworth, by his first wife, was born on January 1, 1767, at Harle Hous, leading a most secluded life. In the year 1782 her father went with his family to reside on his estate at Edgeworthtown, until when, except for a few months in her childhood, her daughter had never been in Ireland. From that time however Edgeworthtown became her abode, and she lived there the remainder of her long life, with the exception of occasional visits of a few weeks only to England, Scotland, and France, and for about two years at Chloton in attendance on her sick step-mother. The neighbourhood of Edgeworth- town did not afford much congenial society, the family of the Earl of Granard, and Pakenham, the Earl of Granard at Castle Forbes, and that of a Mr. Brookes, being the only ones whom they visited; and Pakenham Hall, she says, was twelve miles distant, with a vast Serbonian bog between us, with a her long life, with the exception of occasional visits of a few weeks only to England, Scotland, and France, and for about two years at Chloton in attendance on her sick step-mother. The neighbourhood of Edgeworth-town did not afford much congenial society, the family of the Earl of Granard, and Pakenham, the Earl of Granard at Castle Forbes, and that of a Mr. Brookes, being the only ones whom they visited; and Pakenham Hall, she says, was twelve miles distant, with 'a vast Serbonian bog between us, with a her long life, with the exception of occasional visits of a few weeks only to England, Scotland, and France, and for about two years at Chloton in attendance on her sick step-mother.
Einleitung

1834, Orlandino, extends its length after the joined but somewhat different line of the Eifel. It was opened by Miss Edgeworth's works, which were published several years ago in a collected series. The manner in which they describe, especially those of fashionable life, belong to the same degree to a past generation. But their delineations of character, more particularly of Irish character, are so true to nature, and there is such a vein of quiet humour and practical good sense running through them all, that amidst the more exciting plots and strong situations of the novels of our own time, the more important may be referred to as worthy of a lasting place in our literature.

Miss Edgeworth passed a quiet but useful life with her family; she maintained an extensive correspondence with many friends and literary acquaintances, and at length died May 21, 1849, at the venerable age of 83.

EDG. ELEONOR

EDMONTON. [MIDDLERS.] ELE. SAND. [AMONTYNS, N. J.]

EGG. [REPRODUCTION. S. J.]

EICHORN, CARL FRIEDRICH, son of Johann Gottfried Eichhorn, obtained considerable celebrity as a able and learned jurisconsult. He was born on Jan. 20th of 1795. After passing through the usual course of academic and legal training, he was named in 1805 professor of Roman Law at Frankfort-on-the-Oder. In 1811 he removed to Berlin, and, in 1815, was named professor of the Law, in each place holding the same chair as at Frankfort. Ill health however compelled him in 1828 to resign, and to retire to an estate he possessed near Tübingen. Having somewhat recovered, he was in 1831 again summoned to Berlin, and along with his professorship he received an appointment in the ministry of foreign affairs. At length in 1833 he resigned his professorship, and devoted himself entirely to his official duties and to writing. About this time he was regarded as the ablest authority in Germany on the subject of the Roman Law, and of the commission of legislation. He died in July 1854.

Carl Eichhorn was one of the most erudite exponents of the ancient Germanic law, of its origin, its growth, and its various bearings. As the associate and fellow-labourer of Savigny, he was able to bring the different branches of the subject as the main object of his investigations, and as holding the chair of German law for so many years, Eichhorn exercised an important influence on the study of law in Prussia. His principal writings are—Deutsche Staats- und Rechts-geschichte, 4 vols. Svo, Göttingen, 1806-15, which work has passed through eight editions; Grundriss des Kirchenrechts der Katholischen und Evangelischen Religionspartei in Deutschland, 2 vols. Svo, Göttingen, 1831-33; and Einleitung in das Deutsche Privatrecht, mit Einschrankung des Lehrbuchs. In conjunction with Savigny and Geschoß he also carried on the Zeitschrift für geschichtliche Rechtswissenschaft, Berlin, 1815-1843.

Eichhorn's Almanach in the Rhine-Provinz, extends along the left bank of the Rhine between Bonn and Coblenz. Its proper geographical boundaries are the Rhine on the east, which divides it from the Westerwald; the deep valley of the Moselle on the south, which separates it from the Rhineland and the Hunsrück, north-eastern offshoots of the Voges; the Our or Ourthe, the Ardennen hills, and the Meuse on the west; and the great flat plain of the Lower Rhine on the north. The name however is confined to the region that stretches eastward from the German Rhine, and extends to the Moselle. The head of these rivers lies an extensive highland called Petersberg, or Paanss (from the Celtic pecs bagi)—a dreary waste covered with turf-bogs, mosses, and reeds, and rising between 1800 and 2000 feet high, with a length of about 16 miles every way, which connects the Eifel with the Ardenne,

and offsets of which stretch nearly to the Menser below Aix-la-Chapelle.

The Eifel is a rugged, desert, and in parts swampy table-land, with the exception of 1400 to 1600 feet above the Rhine. Its slopes are scored in places by deep forests, and valleys, which are traversed by tributaries of the three great rivers named above. The flat surface of the table-land with the exception of some rather extensive forest-tracts, presents a barren, marshy, and barren soil; but here and there rise up abruptly narrow crags and cones of various elevations, some of them richly wooded, with wide-spread layers of ancient lava between. The general condition of the region is clay, flint, limestones, and slate; but the hills and rocks in some places are craggy, and the ravines, and glets of the Eifel are in many instances composed of basalt or caved in with it; indeed the Eifel almost everywhere bears traces of violent convulsions and volcanic actions. Extinct volcanoes, cauldron-shaped depressions, tarns of circular shape filling up ancient craters and locally called 'Maare,' mineral-springs, lava-streams, columnar basalt, fossil zoophytes and shells, showing submergence under some ancient waters, are among the natural curiosities of this interesting region.

Amongst the highest points in the Eifel the following may be mentioned:—The Hohen-Acht, above Adenau, 3244 feet above the sea; Nürberg, which is also near Adenau, and is crowned with an extensive feudal castle, 2621 feet; Kelberg, near the source of the Oos; Michaelberg, near Müntersalve, 1600 feet; and the Schneifel, or Snow-Eifel, in the circle of Prüm, in the wildest part of the region, 2100 feet.

The Eifel is a length from east to west, between the Rhine and the Our, of about 50 miles. Along the left bank of the Rhine, north of Andernach, it extends for about 20 miles; but in the interior the breadth is in some places more, in others less than this. Rivers flow from it in all directions. On the northern side of the land (a small town in the government of Cologne with about 1600 inhabitants), rises the Eifel, which flows with rapid course down into the low country, and enters the Rhine at Grimburg. Further to the south is the great Flüss, on which, which flows westward, rising in the mountains between Malmedy and Montijo; after reaching the low country it runs north-westward past Düren and Julich, and, belonging Belgian Limbourg, joins the Meuse on the right bank at Kerneuburg, and flows in a course of about 80 miles. Both of these rivers sweep down the stone and gravel from the highlands; they are subject to frequent and sudden swells, and abound in fish. Their water-power is turned to use, and the town of Düren itself is supplied with water from them. Before it leaves the Eifel the Rhine receives on its right bank the river of the Eifel, which rises near Blankenheim, and passes Gemünd, a small town in the government of Aachen with about 1000 inhabitants, who manufacture woolen-cloth and leather. Not far from the town the Rhine, which rises in the mountains between Past Malmedy, and throws itself into the Ambrève, a feeder of the Ourthe, in the Belgian province of Liège. The Ambrève itself rises a little south of the Warthe, which it joins a little below Malmedy. Malmedy, a town in the government of Aachen, stands on the Warthe, and has about 4000 inhabitants. It is a quietly-built place; the houses and gardens are all in the Dutch style. The town is famous for its manufacture of sole-leather; there are above fifty tannery yards, and the manufacture of leather, and of some woolen-cloth, lace, soap, potash, and glue. Monsiande stands in a marshy country between two high hills on the left bank of the Warthe, and has a population of 3000, who manufacture wools-stuffs, leather, and iron. A large, strong, and gloomy castle above the town is said to occupy the site of a hunting-seat erected here by Charlemagne: it is a fine specimen of a feudal fortress.

On the southern slope flows the Our, which passes Renland and forms a branch of the Warthe, and is exemplary between Rhenish Prussia and the Dutch province of Luxemburg. The mouth of the Sure, a feeder of the Moselle. The Sure receives also from the Eifel the Prüm, which rises in the wildest part of the district. Just above its junction with the Warthe the Prüm has a number of small vilages, and is in the government of Trèves. It is situated to the north of the Schneifel at the foot of a beautifully wooded hill, and has 2100 inhabitants. Its name is taken by corruption from that of the Benedictine Abbey of Ad Praxm, founded here in the 8th century, and in which Pope, natural son of
Charlemagne, and the emperor Lothaire were monks: the latter died here a.d. 853. The abbey buildings were destroyed by fire in 1789, with the exception of a small portion which is of the Italian style, and which has since been rebuilt near the ancient foundations.

The road from Aix-la-Chapelle to Trèves passes through Prüm, and coincides at some points with the old Roman road from Cologne to Gelnhausen, of which a portion is the western part of the Millstatt. The old town of Prüm, which lies about 9 miles to the north of Prüm. Near Distel, is the ancient Bedeck Vicks, a town of about 2000 inhabitants, midway between Prüm and Trèves, a Roman villa, in excellent preservation, and two Roman milestones, set up in the reign of Hadrian, which are of interest to collectors.

Southwards also, and near from the source of the Roer, flows the Kell directly into the Moselle a little below Trèves. At Gerolstein, a picturesque little town of 600 inhabitants, on its left bank, the river runs between cliffs of limestone and sandstone, in the lower part of which is the castle, dry crater, the surface of which is cultivated, several old lava streams, caverns, basaltic rocks, and mineral springs. Fossil shells and corals are found strewn over the fields at Auberg, in the neighborhood of Gerolstein. Olivine and pallasite are found among the dry craters of Dreiser-Weihen, about six miles east of Gerolstein.

Further east, but still on the Moselle slope of the Eifel, flows the Lieser, the Us, and the Elz. The Lieser passes Duin, an inhabited town of 1200 inhabitants, near the town of Li-ter, which has a population of about 1000. At the village of Duin, which has an old castle (the family residence and birth-place of Marshal Dauin, who led the Austrian armies in the Seven Years War), there are three massive walls erected from the former partition of the rock. To the southward of Duin and on the left bank of the river, is the village of Mandelscheid, famous for its old castle and for the basaltic marble in its neighbourhood. On the hill of Mosenberg near it are the two volcanic cones of slag, from one of which a lava stream descends to the valley of the Lieser. The Meerfelder mass is about 100 fathoms deep, and the Pulver mara, one of the largest and most beautiful of the crater lakes in the Eifel, is 200 feet below the sea level. The village of Struthschen is built in a dry crater.

The Lieser rises not far from the source of the Us, and flows south-east down a wooded gorge, in which it makes innumerable windings, bounding from side to side against the cliff on the left. On the way, it crosses the little village of Mosel-Kern. The Els forms some pretty cascades, and passes the castles of Pyrmont and Elz. The Els-Schloss is one of the most picturesque and best preserved old ferral forresses in Europe; it begins to yield to decay but is still inhabited. On the opposite rock stands the rival castle of Trutz-Els, erected by the Bishop of Trèves, against the lords of Elz. The castle of Pyrmont was burnt by the Swedes in 1641. Between the mouths of the Us and the Elz, on the left bank of the Moselle, stands the town of Kochen, prettily situated on a hill, with two old castles frowning from the adjacent heights. Although a pretty object from the Moselle it is a very dirty place. Population 2000.

On the eastern slope flows the Nette and the Ahr. The Nette rises to the east of Adenau, and runs first to the southeast and then eastward into the Rhine a little above Anderach, which town has been already noticed. [Annenach.] The Ahr rises by the Hardenberg T and running northeastward through a valley abounding with wild and most picturesque scenery, past Altenahr and Ahrweiler, enters the Rhine between Remagen and Sinzig. In the upper part of its valley the Ahr is joined by the left bank of the Adenau near the small village of Adenau, and over the hill of Landskrone in the Arththal, are ruins of a castle built by the emperor Philip of Hohenstaufen in a.d. 1205. The Ahr is celebrated for its minnows, trout, and craw-fish. A fine road runs up the valley and in parts is carried by tunnels through the rocks. Adenau, is a small town of 1300 inhabitants, at the foot of the Hope-Acht. Ahrweiler, is a pretty walled town entered by four gates, and has about 2500 inhabitants, who are chiefly engaged in the growth of the vine. It is the centre of the wine trade of the valley, and has a beautiful gothic church erected in the 13th century.

The Brohlbach, a small feeder of the Rhine, enters that river near the castle of Brohl, a small village, midway between the mouths of the Nette and the Ahr. It is supplied with water from the Eifel, paper-mill and several terraces, in which the volcanic tufs, quarried in the neighbourhood, is ground for exp-rt to Holland; the tufs, reduced to dust, is used by the Dutch for making cement, or lime, or for many other purposes. In the tufs quarries in the valley of the Brohl, land shells and trunks of trees r-rduced to the condition of charcoal, are found imbedded. Mineral waters, resembling Seltzer, are got from springs in the valley of the Brohl. A little north of Brohl is the castle of Rheineck, recently repaired by Professor Bethmann Hollweg, of Bonn. Sinzig is a small ill-built walled town of about 1600 inhabitants, with an intere-t-ting gothic church, erected in the beginning of the 12th century; an adjoining chapel contains a natural mummy which was carried away to Paris and the French extended their frontier to the Rhine, but was restored at the peace. Sinzig occupies the site of the ancient Septinium, near which is the town of Siglo.

The town of Prüm runs along the left bank of the Rhine nearly coincides with the present diligence road between Bonn and Cologne. Remagen, a small place of 1400 inhabitants, is occupied by the Eifel Hypogea. Roman sub-quoties have been found here.

About 6 miles inland from the mouth of the Brohl, is the large and beautiful crater-lake of Lach, or Lacher-see, about 2 miles long and about a mile and a half broad, and so deep increases towards the centre where it is 214 feet deep. The lake is hemmed in on all sides by a ridge of hills covered with wood down to the water's edge. It is supposed to have been formed by an effusion of volcanic gases issuing from an opening on the north-east side of the lake; and in a neighbouring pit bodies of birds have been found killed by the noxious vapour, which circumstance has given rise to a popular notion similar to that connected with the Nemi lake in Italy, that the birds fly over the Lachsee. The lake is fed by numerous springs beneath its surface, which keep its basin always full. Its waters are clear, deep, blue in colour, very cold, but never freezing; and abound in a great variety of fish. Some of its volcanic origin, but the superstructure is carried off by an underground current very nearly a mile long, cut in the 12th century by the Benedictine monks of the now ruined abbey of Lach, which is a little south-west of the lake. The shores of the lake are covered with masses of basaltic rock, and in some places the old church of the abbey, or Kloster-Lach as it is called, was suppressed at the time of the first French revolution. Part of the old buildings that remain is now converted into a farm-boste; the church, a beautiful specimen on a small scale of the round-arched gothic, erected in the early part of the 12th century, has been purchased in order to preserve the Frisian government. In the gardens of the abbey, the lake and village of Lacher, are favourite places of resort with the Frisians. The lake is named after the ancient Lach valley, and the ancient Lach, or Lacker, are several millstone quarries, a paper-mill, tan-yards, and mineral springs. To the geologist, the botanist, and lover of the picturesque, all the southern and eastern part of the Eifel is extremely interesting. Besides the Lacher-see, there are a great number of other most extinct craters, exist between the Nette and the Ahr.

The climate of the table-land of Eifel is damp, and much colder than that of the plain of the lower Rhine; cold misty fogs frequently hover over it. In all Prussia there is no place so poor in arable land as the Eifel. The rugged surface
the region is covered with wild heath or swampy bog, the thin casing of the soil not affording nourishment for the roots of the trees. Some parts of it however, as before stated, are clothed with forests. This is especially the case in the districts covered with volcanic deposits. The chief species of forest trees are beech, oak, and fir, which are grown for the supply of fuel and timber, the species of which the forests are inhabited, and in these the population is gathered into small towns, villages, and hamlets, most of which have sprung up under the favorable protection of some feudal castle, and a few of which have been abandoned. The rapid slopes along the Ahr valley and towards the Rhine, vines and fruit trees yield valuable crops; here every piece of cultivated land is covered with walnut, apple, pear, or cherry trees. The wine of the Ahrthal is of excellent quality.

Richard Riibenach, of Bonn, said, that in the lower parts of the region annually from Cloppenburg for cherries. Walnuts are a favorite crop in the hills but not in the valley bottoms, where it is said, the leaves of the walnut tree injure the soil. The nuts are preserved for oil. Apples and pears are sliced and strung upon pack-thread to serve as vegetables in winter. The fruit of the valleys of the Eifel is good generally; but the apples and pears grown on the Moselle slope are particularly delicious, and not surpassed by those of any region in the province. Grapes are also grown, the number of which is restricted in quantity; the deficiency is supplied from the neighboring districts.

The region of the Eifel is exposed to a phenomenon called Wolkenbruch, or Cloud-Burst, being a sudden discharge of water, from heavy clouds. The torrential rains, intense thunder and lightning, which may strike; trees are rooted up and hurled down by suddenly formed torrents; cattle, houses, soil, and crops are swept away. A cloud-burst of this description destroyed the greater part of Mittenscheidel in 1611.

The principal roads through the region of the Eifel are those from Aix-la-Chapelle to Trèves, and from Cloppenburg to Bonn; the high road up the left bank of the Moselle from Cloppenburg to Trèves, and the new road up the Ahrthal to Trèves. The prosperity of the region is not nearly as great as the stories of the roads, but most of these are bad. The great Roman road made by Agrrippa from Trèves to Cologne traversed the western part of the Eifel. Along it were numerous post houses (mutationes) and six "manstane," serving as military posts and hotels. Busch, vicus, now Bitburg, was one of these "manastane." Zelzach (population 1900), near the Nassel, a feeder of the Erft in the plain, at the northern base of the Eifel, was another of the manstanae, and was called Tolbiacium. The road is still in a perfect state at Zelbach. Remains of an aqueduct, which ran from the Erft to the town, and of just such aqueducts as the stations with water, are still visible at ten or a dozen different places between the two cities. The road along the left bank of the Rhine, between Remagen and the precipitous projection of Rolsandrucks, has been laid down and is bad, and connected with the ruins of an old castle, is cut in the rock. In making this part of the road several Roman remains were found. Connected with Rolsandruck is the circular crater of Rodersberg, which is a quarter of a mile across and 100 feet deep; its sides, which are composed of tufa and scorion, are cultivated. The castle of Godtberg, a town of about 1000 inhabitants, a short distance north of Rolsandruck, is an interesting object on the road and from the Rhine. Between Godtberg and Bonn, at the north-eastern extremity of the Eifel, and the coal and iron mines are still a few miles from the town, and their ditches are not much more than twenty or thirty yards from their edge. The coal is said to be of the kind called lignite or fossil wood, and has evidently resulted from the subidence of some primeval forest; fossil fishes, fresh-water shells, and very fine and beautiful moss live in the springs, and the coal is a very easy and expedient remedy to landlords whose tenants are in arrear, or who hold over after their term has expired or been determined. The Common Law Procedure (re-enacting 1 Geo. IV. c. 67) allows a landlord, on serving a writ of ejectment to a tenant holding over after his term has expired or been determined, to give him notice that he will be required to give bail (if ordered so to do by the court or a judge), conditioned to pay the costs of the suit and damages in case of an adverse judgment. If bail is thereupon to be given, or the tenant fails to do so, the claimant obtains immediate judgment for recovery of possession and for his costs. In ejectments also between landlord and tenant the claimant may go on, after proving his right to recover, to give a writ of mesnes profits, and the jury shall thereupon give their verdict on the whole matter, both as to the title and mesne profits; so that in such cases a second action for mesne profits is unnecessary. Besides these remedies a landlord may, in cases where the rent or mortgaged debt has been paid, proceed in the County Court (19 & 20 Vict. c. 108, ss. 50-58). And if the rent does not exceed 20L, and no fines has been paid, he may proceed summarily before the justices in the petty sessions (1 & 2 Vict. c. 72). (Blackstone's "Commentaries," Mr. Kerr's edition, vol. iii., p. 210.)

John Dow's suit was attended with one great disadvantage; it could only be followed out during the year, and so that, if a right to lands in Yorkshire accrued on the 1st of June, the person entitled was unable to bring his adversary into court before the following November, or in case of a defence, to proceed to trial before March in the following year. The fictions on which Old English law was founded were now found objectionable, and accordingly, when the procedure of the Superior Courts of Common Law was reconstructed in the year 1852, a new mode of proceeding for the recovery of lands or rents was created, which possesses the one distinguishing peculiarity of the old action, that in it no question can be raised except that of title.

This new action is commenced by the issue of a writ, directed to the persons in possession by name, and to all persons entitled to the property as from the commencement of the term; and it isua; and commands the persons to whom it is directed to appear within six months to defend the possession of the property claimed; a notice being added, that, in default of appearance, they will be turned out of possession. This writ is served on the tenant in possession, or, in case of a vacant possession, by posting a copy thereof upon the door of the dwelling-house, or other conspicuous part of the property. Every tenant served with a writ must give immediate notice thereof to the landlord, to enable him to take possession and to rack rent of the premises held by him. The object of giving the landlord notice is, that he may be permitted to defend, which he has a right to do, for frequently the tenant has no interest in the premises beyond the temporary possession. A writ of ejectment, unlike a writ of possession, does not authorize the tenant to defend the possession; for possession has now become the very essence of property, twenty years' uninterrupted possession constituting a title good against all the world.

If no appearance be entered, the claimant obtains judgment to recover possession of the land claimed; which he does by the writ asserts his right. By entering an appearance, the tenant, or the landlord, or any other person admitted to defend, denies that right. The parties are then at issue on the writ, and the next action which the claimant must prove is the landlord's right to a writ on the trial, which must take place, in all ordinary cases, in the county where the property is situated; the proceedings at and after the trial being the same as in ordinary actions.

Such is the modern way of trying the title to lands and tenements. It is founded on the same principle as the ancient writs of assize, being calculated to try the mere posse- 
sions title to an estate; and has succeeded to those real actions, as being infinitely more convenient for attaining the end in view; and it is probable that the practice of giving a very easy and expeditious remedy to landlords whose tenants are in arrear, or who hold over after their term has expired or been determined. The Common Law Procedure (re-enacting 1 Geo. IV. c. 67) allows a landlord, on serving a writ of ejectment to a tenant holding over after his term has expired or been determined, to give him notice that he will be required to give bail (if ordered so to do by the court or a judge), conditioned to pay the costs of the suit and damages in case of an adverse judgment. If bail is thereupon to be given, or the tenant fails to do so, the claimant obtains immediate judgment for recovery of possession and for his costs. In ejectments also between landlord and tenant the claimant may go on, after proving his right to recover, to give a writ of mesnes profits, and the jury shall thereupon give their verdict on the whole matter, both as to the title and mesne profits; so that in such cases a second action for mesne profits is unnecessary. Besides these remedies a landlord may, in cases where the rent or mortgaged debt has been paid, proceed in the County Court (19 & 20 Vict. c. 108, ss. 50-58). And if the rent does not exceed 20L, and no fines has been paid, he may proceed summarily before the justices in the petty sessions (1 & 2 Vict. c. 72). (Blackstone's "Commentaries," Mr. Kerr's edition, vol. iii., p. 210.)
The elements of Elastic Tissue are cylindrical or band-like fibres with dark contours, very minute, and when present in large numbers they exhibit a yellow tint, which it has been called Yellow Tissue. The fibres acquire sometimes little cavities in particular spots, which give these fibres a striated appearance, as seen in the giraffe. The elastic tissue is rarely found in large masses, but is very frequently mixed with areolar tissue, and occurs in the networks or organs into which this tissue enters, and constitutes their special feature, are—

1. The elastic ligaments, in which the tissue, with only a slight admixture of connective tissue, is rarely, if at all, seen, and it is only rarely that the areolar tissue is contained in the fibres.

2. The ligaments of the heart, the ligamentum nuchae, the ligament of the larynx, and stylo-hyoid ligament.

3. The dura mater, which appear either in the form of fibrous networks or of fenestrated membranes, and are found in the walls of the vessels, especially in those of the arteries, in the trachea and bronchus, and in the fascia superficialis.


**Election.** The proceedings on the election of knights and baronets to the Commons House of Parliament have formed the subject of several recent statutes; all of them, moreover, are based on the principle of not taking up more than one vote at an election. *With this view, the elections, alike in counties and boroughs, must now be completed in one day, so that neither time nor opportunity may be allowed of extensively tampering with the voters.* The thoroughly formal proceedings are still taken under the original Reform Acts; but the bribery oath can no longer be administered to a voter. In order, however, to restrain bribery, treating, and intimidation, the returning officers are now required annually to appoint election auditors, who can alone account for the respect in which the election is paid by the candidates. Stringent provisions have been made for inquiring into charges of corrupt practices, by Committees of the House, sworn to the performance of their duties. Bribery, if proved, involves the disqualification of the elector, and the disqualification of the member chosen if the charge is brought home to him. The candidate is required to appoint his own agents, in writing, so that they may be known; and to send all accounts and a note of all his money spent in connection with the election to the returning officer; which, when audited and paid through the auditor are to be published in the local newspapers. It may be added here, however, that both the method of proceeding at elections, and the principles which ought to guide legislation on that subject are at present under consideration; the present method is being only of temporary operation and of an experimental character. (Blackstone's "Commentaries," Mr. Kerr's edition, vol. i. p. 168.)

**Electric Telegraphs.** In the previous Supplement a full account of the discovery and of the application of the electric telegraph was given. ([Telegraph, Electro.) All that remains now is to complete the account by a statement of its more important improvements, and more especially of the success and rapid descent of messages by submarine telegraphs, bringing the most distant countries into almost immediate connection.

At the present time almost every important town in Great Britain, with the exception of Inverness in the far north, and Plymouth in the south-west, is furnished with means of telegraphic communication to other towns. As fast as any new railways, whether trunk or branch lines, are opened, so surely is the telegraph now laid down; insomuch that the length of telegraph is nearly coincident with the length of rail. The extension of this railway is such as to disturb the simplicity of the rule itself. From Cornhill, from Charing Cross, from the government offices, and from numerous other places in the metropolis, messages are every day sent, not only to Edinburgh, but to Aberdeen in one direction, to Liverpool in another, to Dover in a third, to Southampton in a fourth, to Plymouth, to Milford Haven, to Holyhead; indeed, to almost all of our outports, and to nearly every inland town of any commercial pretentions. A system is everywhere acted on that the principal railway stations shall at the same time be telegraph stations, some of the wires being for public use, and the others for railway use. The charges have been reduced to a great extent, to the great satisfaction of all parties; and the messages now sent are of countless variety—the price of funds, the state of the markets, orders to purchase, the arrival of ships, the receipt of important news, the Queen's speeches, the result of elections, the divisions in Parliament, and a thousand other things. The wire may be seen while travelling, the state of the weather, the verdict of an important trial, the sending for a doctor, the detection of a thief or murderer, inquiries after health, announcements of illness or of death, inquiries after lost luggage—these are things which are daily sent over the wires, and are often confided to communications intrusted to the copper wires.

In most parts of England the wires, as from the commencement of the system in this country, are supported on poles at a height of several feet from the ground, in a few cases, such as along the coast-road from London to Dover, a subterranean arrangement has been adopted: the wires being encased in a wooden trough, and deposited a foot or two beneath the surface of the ground. This is also adopted in the streets of London, and of other large towns.

An interesting use of the sub-way telegraph may be here noticed. In proportion as the use of Greenwich time has become familiar on all the English railways, so has it become impossible to regulate these, when at a distance from the principal station. So a wire has been carried from the Observatory, through Greenwich Park, and across Blackheath to the Lewisham station of the Kent Railway; thence to the London Bridge station; and thence to the South-Eastern station in the Strand. The top of this office has been erected a hollow shaft, up the interior of which the electric wire is carried, and a large light ball, capable of moving eight or ten feet vertically, slides easily up and down near the top of the shaft. At ten minutes before one o'clock each day the ball is raised nearly to the top of its shaft or spindle; and at five minutes before one it is raised quite to the top. At one o'clock precisely, exact to a single second, the great or master-clock at Greenwich Observatory puts in action a small piece of mechanism which sends an electric current through the wire to the Strand; the wire at this end is connected with another piece of mechanism, which releases the ball and allows it to fall suddenly. The ball falls upon a kind of piston in an air-cylinder, so that at any moment, say, four minutes before two o'clock, the air electricity, as it is called, may be turned on, the piston, the air being compressed, is then allowed to escape, and the ball, falling, is sent down the shaft to the London Bridge, travelling; and a similar mechanism is in the Strand. The ball, falling four times in a day, is thus able to give a time to every part of the town.

The daily time is thus kept on the River Thames, and emitted; though the ball only goes down to Hammersmith, a large part of the town is dependent on the wire for the time, as many streets are but a few feet above the level of the Thames; as it is six feet in diameter, exhibits bright colours, and falls through a considerable space, its descent can be seen for a great distance on all sides; and all who choose to regulate their clocks and watches are thus able to accomplish it. The time of the day is sent down the Strand from four to nine o'clock, and from nine to four o'clock. In order to give the time to the ladies, the wire is continued down the street. By the use of the electric telegraph the time can be set to the electric telegraph office, and the time thus set is passed down the wire to the Strand. It is capable of being set in the Strand, and from there it is passed down the street, and by the use of the wire the time is sent to the ladies.
apparatus for drawing up the wires to the proper degree of tightness, and joining the several lengths together. The great number of wires which we see along the chief lines of railway are not all necessary for transmitting one message; a single wire will effect this; but many are required to keep up correspondence of different kinds, and with various stations.

The 'needle telegraph,' as it is called, is still the one generally used in this country; that is, one in which, instead of pressing down the keys of a finger-board, the manipulator works a needle with which he indicates the letters and numbers, the relative positions of which indicate letters and words. The action of the machines was sufficiently described in our former article. [Telegraphis, Elec.;] Improvements have been since introduced, but the principle is in its general features such as Morse and Cooke and Wheaton made it many years ago. The Electric Company have purchased many patented inventions and machines, to be used subsidiary to the needle-telegraph.

Much as there has been of litigation in England concerning electrical telegraphs and inventions, it bears no comparison with that of the United States, where the system is developed with so much more completeness. The telegraphs principally employed in that country are those of Morse, Bain, and House; and it is chiefly the owners of Morse's patent who have secured the greater rights from the government and settlers. The dots and lines of his alphabet; the passing of one or more points, alternately over the paper and over the holes in the paper, broke and re-made the galvanised circuit with great rapidity; and in order to aid the work, Mr. Bain invented an ingenious machine for punching the holes in the paper. The actual transmission was very rapid; but by the time the punching and the subsequent translation into English were completed, not much time was gained over the ordinary methods.

In relation to the wires linking Great Britain with other countries, the submarine principle has been brought very remarkably into operation. Beginning at the north, and working half round the island, we first meet with the Portpatrick and Carrickfergus cable (24 miles) dipping between the North of Ireland and Scotland, and connecting Scotland with Ireland. At one end it joins the submarine cable from Portpatrick through Stranraer to Ayr and the centre of Scotland; the other through Stranraer to Dumfries and the network of British lines. At the other end the cable is connected with various Continental systems.

Without any difficulty a message is sent from London to Ireland via Dumbries without regard to circuitousness of route; for the electric current runs little distance. Next comes the Holyhead and Dublin cable (64 miles), joined at one end to Great Britain and at the other end to one of the Irish lines. In the south is the Hants and Isle of Wight cable, not very important commercially, but establishing electric communication with her Majesty's marine residence at Osborne; it is connected at Hurst Castle through a land-wire running through Yarmouth to Osborne. Farther east is the Dover and Calais cable (28 miles), connected at the two ends with the systems of France and Belgium respectively. Another is the Dover and Ostend cable, connecting England with the Belgian and European wires generally.

Lastly, there is the Orfordness and Hagne cable, joined at one end to a land-wire running to the Ipswich station, and connected with the Dutch land system at Den Hurn station, and at the other end with a land-wire passing through Yarmouth to Osborne. Farther east is the Dover and Calais cable (28 miles), connected at the two ends with the systems of France and Belgium respectively. Another is the Dover and Ostend cable, connecting England with the Belgian and European wires generally.

Directing attention next to the continent of Europe, we find telegraphic wires radiating in all directions. Nations were never more struck with the wonders of the electrical telegraph than on the occasion of the death of the Czar Nicholas in 1855. On the 2nd of March the Earl of Clarendon announced in the House of Lords that the Czar had expired. The news travelled from St. Petersburg to Paris and Berlin, and lain in four days, by means of the actual electric current. Other distinct messages had been received, one from Berlin and the Hague, the other via Berlin and Ostend, both communicating a message telegraphed to Berlin from St. Petersburg, and all in four days, by means of the actual telegraphic current. The dreary wastes of Russia have been brought within the civilising influence of the bit of copper wire, and lines in all directions have been laid, with or without regard to railways. Nearly all the chief cities in Europe are now linked together. Circuits, as is the case from London to Trieste, going through Belgium, Prussia, several minor German States, Saxony,
Bohemia, Austria, and Istria, the connection is nevertheless complete; and telegrams are twice a month transmitted to us relating to Indian affairs, brought to Trieste from Alexandria. Italy, in railways and in telegraphs, is as far in advance of Austria as it is lower than that of Italy. Turkey, to the great astonishment of many of the Osmanlis, has been made a sharer in the fast-going, high-pressure operations of the age: she possesses an electric telegraph, extending from the Black Sea to Trieste; and, according to the most recent messages, will now be finished from London to the seat of the Ottoman empire. During the Russo-Turkish war, an electric cable 300 miles in length was sunk in the Black Sea from Varna in Bulgaria to Kamiesch in the Crimea, there to be available to the Osmanlis engaged in the Mediterranean, and especially in Sebastopol: it was one of the many contributions of peaceful industry to dread war. The Czar Alexander and the Sultan Abdu-l-Medjid, now that hostilities have ceased between them, might, if they did not exchange for telegraphs, for there is an uninterrupted copper wire extending all the way from the capital of the one to that of the other, passing in its route through Berlin, Dresden, and Vienna. Nay, if business or pleasure suggested it, a dozen emperors and kings, seated in a dozen capitals, might exchange greetings all in one day, or perhaps in an hour or two, and might make a score of petty princes sharers in the achievement.

We pass now to the routes for traversing the Mediterranean by telegraph. The two islands of Corsica and Sardinia, belonging to two energetic sovereigns, have been connected by telegraph with the French and Sardinian colonial dominions: land-wires on the islands themselves, and submarine cables to Corsica and from Corsica to France. This being done—how is it to span the broad Mediterranean, so as to connect Europe with regions far beyond? Glancing at a map, we see that the southern end of Sardinia makes a tolerably near approach to the northern coast of Africa, at a point in the pachalic of Tunis. We also see that Sicily, Malta, the Ionian Islands, and Candia, form spots of dry land which might be used as resting places for separate lengths of submarine cable, should commercial and other reasons justify the adoption of such plan. A cable laid by the Sardinian Government, which has been formed, which has laid down a submarine cable on the first of these two routes. From Sardinia to Malta, and from Malta to Corfu, it was found that the water is of much less depth than in the line of route from Sardinia to Africa; and as these islands lie in the way towards the Levant and Egypt, an enterprising company was engaged to connect the various islands by a chain of telegraphic links. The whole of this line, 450 miles from Sardinia to Malta, and 350 miles from Malta to Corfu, has been completed. The next project; the part of the Austrian Government to extend their telegraph from Tripoli to Tunis, to lay down a submarine cable from Tunis to Corfu, there to join the line just described, and thence to extend it to Alexandria, with or without the Ionian Islands. The intermediate Mediterranean cables, actual or proposed, may thus be classed in four groups: from Spezzia in the Genoese State to Cagliari in Sardinia, promoted and supported by the Sardinian Government; from Cagliari to Africa, by the French Government; from Cagliari to Malta and Corfu, by the English Government; and from Tripoli to Corfu and Alexandria, by the Austrian Government.

Next, a few words must be said concerning the rival projects for connecting Asia with Europe by telegraph. Supposing all the attempts in the Mediterranean to succeed (and succeed they probably will after a time), there will be one terminus of electro-communication on the north coast of Africa, another at Corfu, and a third at Constantinople; and the question then arises, to what place in the system of telegraphy in Asia. Two projects have been competing for public favour during 1857 and 1858—the Red Sea and the Euphrates routes. The first of these comprises a submerged cable along the Red Sea, which is supposed to be laid with a British or a French, or a submarine cable to India; while the other starts from Syria or from Asia Minor, and follows the valleys of the Euphrates through Mesopotamia to the Persian Gulf and the Indian Ocean. The choice of the road depends on the merit of the one or the other; but a look at the map will show that it is of little consequence in the way. There would be a land line of 340 miles from Alexandria to Suez; and then a submerged cable of 4200 miles from Suez to Kurrachee in India in two lengths, joined at Aden as a resting-point.

Between Suez and Aden there would be three resting-points on land, at Cosseir, Juddah, and Camaran; while there would be three others between Aden and Kurrachee, at Ras Shurra-the, the Kocha Mountains Island, and at Ras el Had, in the Iram of Muscat's territory. The promoters say that 700,000l. in money, and one year in time, would complete this great enterprise; but that if the Indian Ocean section, from Aden to Kurrachee, were suspended for two years, the cable to Kurrachee could be completed for 300,000l., in money, and eight months of time, would suffice to establish a telegraph from Alexandria to Aden. The promoters urge that they have obtained the necessary firmans from the Turkish and Egyptian Governments; that a cable has been laid from the districts of territory; that plans are already made by other parties to connect Alexandria with Europe by a cable from Austrian and Sardinian ports; and that, even should these projects fail, the value of the Telegraph Company's wire from Corfu to lay down a cable of 800 miles from Alexandria to Constantinople—in either case ensuring complete telegraphic communication from London to India. On the other hand, the Euphrates Company proposes a land-wire of 1200 miles, starting from Constantinople, stretching south-eastwards across Asia Minor, and thence to the Euphrates, or to Baghdad on the Tigris; then a river-cable to the Persian Gulf, and lastly, a submarine cable to Kurrachee at the mouth of the Indus—the two cables together being about 1600 miles, or 2500 miles as a whole, from Corfu to Kurrachee. The estimated cost is 400,000l., and the time of completion six or eight months.

Having thus noticed the various projects for establishing electro-telegraphic communication between Europe and India, we will consider what has been effected in India. In 1852 Dr. O'Shaughnessy, after a series of preliminary experiments, was empowered by the East India Company to establish a magnificent series of telegraphs in that country. During the remainder of that year, and the whole of 1853, he was employed in procuring from England the immense quantity of material required, and all the working apparatus. He commenced the actual construction shortly before the end of the year just named, and on the 24th of March, 1854, he established a line from Calcutta to Durngapore, in the province of Arcot. Proceeding energetically with his labours, Dr. O'Shaughnessy was able to announce that, on the 1st of February, 1855, only about fourteen months after his commencement, he had completed the whole trunk line from Calcutta through Agra, Delhi, and Lahore; to stock on the Indus; a branch from Agra to Bombay; and another from Bombay to Madras—the whole extending to 3050 miles, and including 41 offices or telegraph stations. During the year 1856 the communications were extended to include Attck to Peshawur on the Afghan frontier, from Rangoon to Meeaday on the Burmese frontier, and from Bangalore to Ootacamund—extending the total length to 4000 miles. During 1856, and so much of 1857 as was uninterrupted by the war, the whole line was completed, and is now extended to more than 5000 miles. Throughout Central India the engineer was opposed by enormous difficulties; there was no metalized road; there were few bridges; the jungles are in many places deadly for at least half the year; and there was no police for the protection of the wires. More than seventy principal rivers have been crossed, some by cables, others by wires extended between masts; the Tombuddra crossing was two miles wide, and that of the Soane more than three miles. The greatest difficulty of the whole was the crossing of the Indus. Madras the telegraph is more substantial than any known in Europe or America; for 174 miles the wire is borne on masonry pillars capped with granite; while for 333 miles it is supported on superb granite slabs, each 16 feet high. The whole expense has, nevertheless, been kept within 60l. per mile.

Viewing the state of telegraphy on the other side of the Atlantic, we come to that which almost baffles calculation. The long wire in Europe is a thing of the past. Telegraphs are now laid in all directions, but the telegraphic wires have far outstripped them in length. The Americans, having millions of acres that belong to no one, or that are of very slight value, set up their telegraphic poles and stretch their wires in spots where no one ever thought to lay a line. The provisions of the Telegraph Act of 1851, though they have been much increased and extended through forests, over rivers, across prairies, over mountains—nothing stops them, and as the engineers and companies care little about strength or symmetry, the telegraphs are set up with wonderful cheapness. Cheaperness of telegraph leads
Atlantic Telegraph.—The effort to establish a telegraphic communication between England and the United States so far transcends every previous undertaking of the kind that we deem it advisable to describe the operations in some detail. The American government under the circumstances with which we have been favoured by a gentleman intimately acquainted with the whole course of the proceedings.

A company having been formed in 1856 for the purpose of connecting the two countries by a line of electric telegraph, under the authority of two acts of Congress, with the requisite capital having been subscribed, the Governments of Great Britain and the United States agreed not only to pay each to the Company a subsidy of 10,000£ a year, for 25 years, but to assist the undertaking, by furnishing the men and ships which should be required in the laying of the cable. The preparation and perfection of the electrical details of the work were left in the hands of Mr. Wildman Whitehouse.

Three gentleman who had practical experience in the work of marine telegraphy, Mr. Canning, who submiered the Newfoundland cable, Mr. Woodhouse, who connected Balaklava and Varna during the Russian war, and Mr. F. C. Webb, who had the charge of the line between Orfordness and the Hague, were associated with Mr. C. Bright, in preparing the cable. In 1856 he was enabled to operate at Greenock, the manufacture of the paying out machinery being intrusted to Mr. Henry Clifford, under the superintendence of Mr. C. Bright. A company which had been incorporated for the purpose of manufacturing electrical apparatus, and known as the “New York, Newfoundland, and London Telegraph Company,” transferred all their rights to the Atlantic Company, securing to them the exclusive privilege of landing a cable upon the Newfoundland shores during fifty years, and upon the coasts of Nova Scotia during twenty-five years. Patent rights in apparatus which would be required in working the line, were also secured to the company by Messrs. Whitehouse and Bright.

Before the actual operations of the undertaking were entered upon, it was found of utmost importance that the capability of transmitting an electrical current through a coated conducting wire as long as the Atlantic is wide, should be put to the test of direct experiments. Mr. Whitehouse had already availed himself of several opportunities furnished by the chance of lengths of cable being under construction, which had separate wires imbedded in the insulated gutta percha mass; the wires being so joined at their extremities upon the occasion of the experiments as to form continuous lines of conduction. In 1856 he was enabled to operate at Greenock, with an extent of 1146 miles. In the following year, with the co-operation of the Magnetic Telegraph Company, arrangements were made for the crowing trial in the presence of Professor Morse, he challenging to be in England at the time and company in the undertaking. The line was laid, and through the sea, from London through Dumbries to Dublin, along a course of 660 miles. They are also so numerous, and so connected with a wide system of ramifications, that, upon need, a length of some six thousand miles can be harnessed. Upon a pre-determined night, that of the 9th of October, ten gutta-percha-covered insulated wires, each more than 2000 miles long, were connected into a continuous circuit of more than 2000 miles. The conclusive of experimentalists met at the telegraph company's offices and, in presence of a pair of Mr. Whitehouse's induction-coils were used to excite the wires, and the current was made to act through one of Professor Morse's ordinary recording instruments. Signals were distinctly telegraphed through the two thousand miles of wire, and received at $10, 241, and 270 per minute! This result was deemed eminently successful, and as proving beyond all fair ground of question, that the transmission of an electric signal through a coated wire laid across the bed of the Atlantic or other large bodies of water, is not only possible, but feasible, for though the greater part of the cable employed in this experiment was subterranean rather than subaqueous, it is now well known to the initiated in these matters, that the two cases are, as nearly as possible, identical in all their essential characteristics.

During the preparation for the construction of the Atlantic cable, and indeed even more available during its manufacture, Mr. Whitehouse was engaged in putting several important matters concerning the rationale of electrical action to the rigid questioning of experiment. Many of the results which were elicited through these investigations are of surpassing interest, and require to be alluded to as constituting notable passages to the pages of the history of electrical science. Foremost among the labourers of the experimentalist, however, necessarily stood the completion of his instrumental means of research. He very soon found that the instruments which had been previously in use as measures of electrical intensity and tension were insufficient for the examinations he had entered upon. He consequently set himself to work seriously to remedy the defect.

The usual method whereby the force of an electrical current is determined, is to produce, by its influence, a magnetic needle placed on a freely suspended needle near to, or within, a many spared coil of the conducting wire. The degree of the magnetic needle’s deflection from its position of equilibrium, was then held to give the acting force of the current. This answered very well so long as only continuous currents of moderate intensity were under examination. When, however, the experimentalist came to deal with sudden and interrupted currents of high intensity, such as the streams are which the Atlantic telegraphists have to deal with, no steady deflection could be produced. The needle jerked fitfully and violently backwards and forwards with so much caprice that it defied the adroitness of the most skilful observer to get any intelligible indication of force out of its position.

This was necessarily the result of the insufficiency to disperse altogether in his investigations with the fibul and unstable needle, and to call in to his assistance, in its stead, that power which is fixed and stable beyond all other forces that are known to man. He resolved that he would avail himself of the magnetic needle, and that he would put its strength in the scale, make terrestrial gravity determine the amount, and send in a record of the same in grams. The ingenious piece of apparatus whereby he accomplished this curious feat of weighing electrical power, Mr. Whitehouse designed; and when he prepared the mechanical details of its construction, his Magneto-Electrometer.

Mr. Whitehouse’s instrument for measuring the force of electrical currents is a kind of a dash pendulum suspended at each side by springs similar to those which are used for the support of the pendulums of clocks. The short end of the steel-yard is armed with a bar of soft iron, and at a short distance beneath this is placed another bar of soft iron, surrounded by a coil of fine silk-covered copper wire, and therefore capable of being converted into a magnet whenever a current of electricity is flowing through the coil. The strength of the artificially formed magnet depends on the power of the current which flows through the coil, and consequently on the extent of the deflection of the pendulum when the long arm of the steel-yard accordingly as the short arm is more or less powerfully attracted. By shifting weights along the steel-yard, by changing these weights for others of different magnitude, and placing them at different distances from the artificially magnetised bar, so wide a range of mechanical adjustment is commanded that degrees of attraction can be accurately estimated from those capable of tilting up but a small fractional part of a grain, to those which can lift many thousands of grains.

Mr. Whitehouse also prepared an instrument which enabled him to compare the velocity of transmission of different currents of electricity through the same wire, or of the same current through different wires. This instrument consists of a single line of galvanism, which supplies a voltaic battery, and of a ribbon of chemically prepared paper unrolled from a drum by a train of clock-work. The pendulum hangs upon a pivot, which is vertically one of the poles of the volatice battery, and its rod is prolonged upwards into a sort of crest, which comes into contact with a spring right and left, as it swings to and fro. The springs, when not touched by the pendulum, press upon a metallic pillar, which is itself the other pole of the voltaic battery. The pendulum is in the form of a cross, having four different things for the time, from the pillar. When it lifts the left spring exactly the opposite proceeding occurs. The wire which forms the circuit, and which is supposed to be a lengthened one, is curled into a coil near to either extremity, and into each of those coils a bar of soft iron is inserted. These bars become temporary
magnets whenever a current of electricity is passing through the coils, but the precise polarity of either extremity depends on the way the current passes. The extremity, which is a north pole when the current issues from the battery through the right spring of the pendulum apparatus, becomes a south pole when the current issues through the left spring. Near to each temporary magnet is placed a permanent magnetic magnet, traveling upon a central pivot, in such a way that it can be acted upon and made to traverse backwards and forwards by the reversal of the temporary magnetism. Now when these traversing magnets lie in one position they make a contact, and turn on each a small local voltaic battery in connection with its magnets. Its polarisation is in the same way, and can be estimated by comparison with the second's long trace, will afford a measure of the time. In this way the length of time the electrical current takes to run through the wire from one printing instrument to the other, can be determined with precision, and also the fraction of the second, which is the linear representative of a second. It does not at all matter what the speed is with which the paper ribbon is unwound beneath the printing style, because the estimate is always a relative one referred at each instant to a particular track made by the printing action. When the pendulum is traversing transmission in any special wire is to be examined, the apparatus is set to work, and a somewhat lengthened series of observations of printed matter is the result, which is thus slowly scrutinised, the secret of the precise recording is rejected, and the mean of all the more trustworthy ones noted as the result to be adopted.

One of the most important deductions arrived at through the instrumentality of this ingenious apparatus, was the fact that voltaic electricity is capable of producing greater mechanical effects at the extremity of any given wire, than the induced electro-magnetic current, but performs its journey through a long coil with inferior speed to its weaker companion. As is commonly the case in other matters, the subsidiary affects of the journey are much greater by the most direct than by the most indirect. Seventy-two pairs of sixteen-inch sand-battery plates lifted 1400 grains on the steel-yard of the magneto-eleetrometer at the end of 800 miles wire, but the current on the west of London was found by Mr. Whitehouse to be only 640 at the distance. Two large electro-magnetic induction coils, excited by a Smees's battery of ten pairs of one hundred square-inch plates, sent forth a current which lifted only 745 grains at the end of the same wire, but which arrived at that end in nineteen hundredth of a second. Simple voltaic electricity is capable of greater mechanical effect, under any given arrangement of conductors, than an induced electro-magnetic current, but the electro-magnetic current through lengthened conductors with a considerably superior velocity to the electricity of the same intensity born forth from induction-coils possesses a treble velocity of transmission, and realises consequently a three-fold working speed as compared with simple voltaic electricity. It was hence obvious that induced, and not voltaic electricity, must be adopted for the wide Atlantic service, where the ultimate commercial success of the enterprise would be mainly dependent upon the number of signals which could be forwarded in any given time.

In my early experiments made to determine the rate of movement of the electrical influence along telegraph-wires, it appeared that it could pass through hundreds of thousands of miles in a single second of time. When however a steady wire was arranged, and was actuated upon with telegraph-wires coated with gutta-percha, it could be proved that the movement of the electric influence through this wire, and through the sea, instead of being freely suspended in the air, it seemed that scarcely thousands of miles were traversed in a second. Different experiments, too, arrived at different results for the rate of speed. In a paper read by Mr. Edward Bright, at the meeting of the British Association in 1834, the statement was made that the velocity of currents in ordinary submarine lines did not exceed one thousand miles per second; this gentleman had also inferred from experiments made in a circuit of 480 miles underground, that the speed of the electric impulse varied with the energy or intensity of the current, and with the nature of the conductor and conditions in which it was placed. When Mr. Whitehouse turned his attention to this question, his investigations amply confirmed the deduction which had been previously drawn. Working with his pendulum-apparatus he found that the mean or true velocity of the electric current in the copper wire, is about 1400 miles per second. But he also ascertained that that of the induced electro-magnetic current is 4300 miles per second. He determined too that the speed of the voltaic current might be raised under especial circumstances to 1600 miles per second, and that of the induced current might be augmented to 6000 miles per second.

But what could be the cause of these varying rates of speed, and of the extraordinary interval which the electrical influence was thus proved to suffer when it was constrained to traverse covered underground or sub-marine wires, instead of air-surrounding conductors? Professor Faraday had thoroughly investigated this question so soon as the usefulness of the apparatus had been at all confirmed, by a series of experiments which caused the most extraordinary and arresting phenomena, but which, however, the wires are inclosed in a compact sheath of insulating substance, like gutta-percha, and are placed in water or moist earth, the affair is altogether changed. A new agent then comes into play, and this is moisture, and any other substance, which, however slightly excited, the electrical experiment operates upon the near at hand outer layer of moisture, and it being a conductor, calls up in it an electrical excitation of an opposite kind. The two electrical forces then pull against each other, and so much the more, the more the insulating sheath, and hold, each the other, fast locked. The inner excited influence keeps the outer reduced force stationary upon the external surface of the insulating sheath. The outer induced force keeps a certain portion of the inner influence in the sheath as a charge, and so prevents it from moving as freely onward upon its journey as it otherwise would. The submarine telegraph cable is indeed virtually a lengthened out Leyden jar, and is necessarily charged with a certain measure of electricity when it is in use. It is a reservoir or bottle for the electricity, which has to be filled and emptied, as well as a channel or pipe through which the influence may be poured. When an extent of water has been deprived of its charge, it may be filled again by a more or less capacious bottle in virtue of its length, however narrow its transverse dimensions may be. In the more ordinary practice of artificially induced electricity, the voltaic current is not able to produce a static charge in a Leyden jar. In the case of the coated wire of the electric telegraph it is able to do so, probably in consequence of the comparatively enormous extent of surface which comes to be concerned. Now it is this peculiarity of the action of the coated telegraph-wire which leads to the slower rate at which the electric influence is transmitted through the main substance of wire. A certain amount of water, that is there, must be filled to satiety with the force before any transmission can be effected, and then must be emptied completely before any new transmission can be made. Mr. Whitehouse was able by delicate instruments to procure a very beautiful illustrative proof that it is a charged Leyden jar, and not simply as conductors, that submarine cables, or subterranean coated wires act. He took fifteen miles of the Atlantic cable, consisting of an internal conducting strand, with its protecting silver-coated envelope, or insulating sheath, and he turned up the further end into the air, thus leaving the conducting wire entirely insulated that way. He next took 200 miles of the same cable, and arranged it in precisely the same fashion. He now found that he could charge each of these cable specimens, and then make the charges to remain for a few seconds in the wire, and then discharge them back through the nearer end, measuring the force of the discharge, and therefore the amount of influence which had been indirectly retained in the wires, by the
magnetic-electrometer as it flowed out under a constrant
which forced it to pass through the coil. The discharge
from the 12-mile length of the wire lifted 1076 grains on
the steel-yard of the electrometer. The discharge from
the 200-miles length lifted 2300 grains. A current which
lifted 18,000 grains upon being simply poured through
the coil of the electrometer, lifted 60,000 grains when allowed
to flow at the end at which it had received the power
charge, and had produced the most powerful effects. If the wires
had been worked at a lower tension, the effect produced would
necessarily have produced the weaker and not the stronger
effect, on account of the electrical influence being attentuated
through its greater extent.

Most electricians had held, previously to the period of Mr.
Whitehouse's investigations, that the available force of an
electric current is diminished by increasing distance, or in
other words by the length of the transmitting medium, in
the rates of the square of the distance it has traversed. It
was very important that a conductor should receive imme-
diate and full investigation, because, if the received dogmas
were true, it was obvious that the difficulty must be very
great indeed, of getting any efficient current to present itself
on the opposite shore of the Atlantic, it having been started
from the American coast, which in itself would be strong enough to produce very decided results at
the distance of 500 miles, would be rendered at this
greater distance almost evanescent. Mr. Whitehouse accord-
ingly proceeded to test the deduction in two ways. First,
by employing at the end of the cable, a positive electrometer,
for determining the mechanical effects in consequence of its having made certain extended journeys; and then by closely scrutinizing its loss of
speed at varying distances. The current from a voltaic
battery, consisting of 72 cells of 6-inch lantern, was trans-
mitted through 4 cables, each consisting of 360 wires of
different lengths. Where the wire was only a few feet long, 20,000
grains were lifted on the electrometer. With a wire 300 miles
long, 10,650 grains were lifted. With 400 miles, 32,650 grains,
and with 600 miles, 75,600 grains. Similar experiments were made with wires ranging from 80 to 1020 miles
long, to determine the rate of transmission. With a length
of wire of 83 miles, the transmission was accomplished in
eight-hundredths of a second. With 168 miles in fourteen-
hundredths of a second. With 248 miles in thirty-six-hun-
dredths of a second. With 498 miles in seventy-nine hun-
dredths of a second, and with 1092 miles in a trifle less than
a second and a half. Taking 83 miles as the unit in these
results, there was a very decided acceleration by applying
numbers of wires. To this, if the so-called law of the
squares of the distances were correct, the transmis-
sion through the 1092 miles of wire ought to have required
144 times as long as the transmission through the 83
miles, which was not the case. The experiments were
employed in the distances represented by the series 1, 2, and
3, the rates of velocity were represented by the fractional
series ½, ⅓. It therefore appears, from experiments, that
nature is more suspicious to the cause of wide ocean telegra-
phy, than the assumption of theory.

During the experimental investigations of this portion of
the subject, a very surprising and an altogether unforeseen
result was obtained. In the attempt to ascertain how small
a quantity-battery would prove sufficient to effect a charge
and a discharge in the Atlantic, an Atlantic cable, Mr.
Whitehouse had a piece of apparatus prepared consisting of
taxi-five pairs of zinc and silver plates, each about the twentieth of a square inch large, and the pairs so arranged that they could hold a drop of acridulated
water between them. On charging this illiputian
battery, by dipping the plates into salt and water, messages
were sent from it through the thousand miles of cable with
the utmost ease; and not only so. Pair after pair was
dropped into the solution, and the message was repeated,
equal facility, until at last only a single pair, charged by one
small drop of liquid was needed. Strange to say, with this
single pair, and single drop, distinct signals were effected
through the thousand miles of the cable. Such signals were
repeated at the rate of 72 words a minute. The reduction of the
time of 1000 miles to less than 30 seconds of time. This remarkable experiment demonstrated how slight a current might be made to give very good results,
when a conductor as perfectly insulated as the copper strand
of the Atlantic cable was made the channel of transmission.

In some of Mr. Whitehouse's early experiments it was
found that the induced electro-magnetic current took a second
and a half to discharge in half, when it moved through a coated
wire 1146 miles long in consequence of the reducing in-
sence of induction in this lengthened channel. This appa-
rently is a very excellent result—a signal conveyed eleven
hundred miles in less than two seconds! It is not enough,
however, for the important service of Atlantic telegraphy.
In spelling out messages, most letters require the use of
sounds each, consequently with this rate of transmission it would
be extremely difficult to send enough words across the Atlantic
within twenty-four hours, to enable the company to work
in the public interest, and to permit the Atlantic submarine
experimenter, therefore, set himself to see whether he could
not find some means of quickening the pace of his too lag-
ging messenger. He ultimately accomplished his object by
means of an arrangement with electro-magnetic coils which
enabled the operator, through the simple reversal of the
poles of the magnet to send currents of different kinds of electricity,
one after the other through the conducting wire. Each suc-
cessive transmission then served to clear away the lagging
envelope of the antagonist current, which immediately pre-
ceded it. The remains of the old current which clung
about the wire pertinaciously, were completely and rapidly put
to the rout upon the stream of an opposite kind being thrown in.
When positive followed negative, and negative followed post-
itive, a current of decided positive force was always
secured. The wire was continually restored as fast as it was
disturbed, and its telegraphic capabilities were in this way
steadily maintained. By the use of these altereded electrical
currents, seven and eight signals were now distinctly recorded
through the same wire in a second, instead of one signal in a second and a half.

When the idea was first entertained that electrical cur-
rents would run along coated telegraph-wires with a velocity
that was inversely proportional to the square of the dis-
tances traversed, it was thought that the difficulty might be
partially overcome by providing them a wider road to travel
along. It was conceived, that if one of two wires of equal
length, was six times as large as the other, that wire ought
to transmit its messages with a velocity three times greater
facility and rate of speed. Hence it was proposed that
long wires should always be made larger than short ones.
But this proposal became a matter of very great consequence
when a cable of sufficient length to span the Atlantic was
concerned. A cable possessed of the Dover and Calais one, if extended enough for the Atlantic
service would weigh not less than 20,000 tons. But if the
Dover and Calais cable were only duly proportioned to its
work, the Atlantic cable would be required, by theory, to be
considerably larger and heavier. It could not be a
16-mile vessel as the Leviathan would be capacious enough to carry
more than a small part of it. The weight, too, that would
be dependent upon itself and upon the stern of the vessel
from which it was to be employed. This weight, it was
found, amounted to a considerable number of tons. Mr. Whitehouse,
consequently, applied himself with considerable anxiety to
determine how far this view was based in fact. He worked
with a 300 miles length of cable which had three insulated
wires running along parallel to each other, but distinct,
through one mass of guita-percha, so that he could use a
single wire, or a double, or a treble one, at will, combined as
one. Some 300 separate observations were made, and to the
experimenter's great relief it proved, that the wire of in-
creased capacity, transmitted its electric currents in a
facility and speed than the smaller one. With a length of 166
miles the velocity of the induced electro-magnetic current was
eight-hundredths of a second in a single wire. With the double
wire it was nine hundredths; and with the trebled wire it
was nine and a half hundredths. Increasing the size of the
conductor actually augmented the retardation of the electrical transmission through it. All Mr. Whitehouse's experiments
taken together seemed to warrant the conclusion, that a tre-
bleded cable would be considerably retarding.

When the actual construction of the Atlantic telegraph-
cable was commenced, certain important facts had therefore
been determined which served as very excellent indications of
the principles upon which the manufacture of the apparatus
would have to be done. It was found that the guita-percha covered submarine wires transmit the agent entrusted
to their conveyance as induction-immenbered Leyden jars,
and that consequently the transmission is effected with
a velocity which is modified and influenced by external

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conditions. Also that induced electro-magnetic currents of a certain determinate intensity, travel more quickly than simple voltaic currents, and that the rapidity with which signals are transmitted by the agency of electro-magnetic currents, can be greatly increased by using opposite electro-magnetic currents, either electrically, or without being electrically, by using one conductor alternately. It was also clear that the diminution of the speed of movement among induction-embarassed wires was not in so high a ratio as the squares of the distances traversed; that several distinct waves of transmission might be made to run along the same wire, so that the largest currents through large coated wires transmitted with less facility and freedom than small ones, in consequence of requiring a larger charge to saturate their inductive capacities before they were in a fit state to transmit; and that therefore the facility of transmission of the greatest movement in wide ocean telegraphy; and that by the use of small wires, very perfectly insulated, and of electro-magnetic induction-coils of powers carefully apportioned to the dimensions of the wires, signals might be transmitted through a distance of 2000 miles with a rapidity amply sufficient for all purposes of revenue to the Company and of utility to commerce.

It was necessary, then, that an Atlantic cable, which was to furnish a fair promise of success, should have a well insulated and conducting core, and a certain moderate speed of movement, so that it should be so light as to be easily conveyed across the Atlantic, and easily handled during paying out, and yet be so dense as to be able to sink with facility to the depths of the Atlantic, and so strong that it could resist any strain to which it might be subjected while in transiton. It was also essential that it should be so flexible that it could be readily coiled up in the store-spaces of the factories, and of the vessels employed in paying out, and rolled over the sheaves of the paying-out alleys, and yet possessing sufficient inertia and rigidity to allow of its lying in a tolerably straight line when once in situ at the bottom of the sea.

The following is the plan which, in accordance with the indications of these multiplied experiments, was finally adopted. A cable made of the seven wires of the purest copper of the No. 22 gauge, was first prepared, it being the sixteenth of an inch in diameter when twisted. The strand of seven wires was adopted in preference to a single wire of the same practical capacity, because the probability of a destruction of continuity was in this way greatly diminished. In case of any accident occurring it was very unlikely that all the seven wires would be broken in exactly the same place, and so long as only one of them remained sound, the electrical transmission could be carried on. The strand itself was subject to a strain which stretched it twenty per cent., without any appreciable injury to its conducting power being discovered. To show that no amount of alteration, which could possibly be produced by accident, could possibly have any influence upon its insulating utility as a telegraphic conductor, one mile of wire eleven times smaller than the strand, was introduced into a gap made in a 600-mile length of the cable, and the effect produced was seen. The transmission of messages after the alteration was tested. It proved that the transmitting capacity of the cable was only diminished by one thirty-seventh part.

As the copper strand was prepared, it was rolled upon drums, and then taken from the drums to have three separate coatings of gutta percha applied, until the aggregate diameter was thus brought up to about three-eighths of an inch. The gutta percha used for these coatings was prepared with the utmost possible care. It was first rapped into shreds, and was afterwards heated and melted through several layers of fine wire gauze, and kneaded for hours in the presence of steam by steam machinery. It was then briefly squeezed through very fine screws, through dyes, as the strand of copper was gradually drawn along between them, and so made to adapt itself as a compact sheath to the strand. The several clear coatings were given to the strand in order that any imperfection left in the first might be compensated and remedied by the next coat applied. The completed core was subjected to a pressure of five tons upon the square inch, by the use of hydraulic presses, and thus became the insulating material being at all injured by the force applied.

During the process of the manufacture of this core it was submitted to constant examination to prove both that the copper strand continued unimpaired, and also that the insulating power of the gutta percha was as complete as it was required to be. The continuity was proved by passing a voltaic current of low intensity from a battery of a single pair of plates, through the strand, and then causin it to record a signal after leaving the wire. A battery of low intensity was employed for this purpose, because it made the test so much the more severe. A strong battery might have thrown the current through a slight imperfection in the gutta percha, which might not have been able to overcome. The due perfection of the insulation was tried by turning up into the air the end of the length of core about to be examined, and by then connecting one pole of a voltaic battery of five hundred pairs of plates with the strands, and the other pole with the earth. At the same time, a copper wire was run through the earth, a magnetic galvanometer being suspended within a coil continuous with the strand. So long as the insulation of the strand was fairly perfect, the copper wires became charged with a very small current, no current passing through the wire, no current was produced through the strand, and no deflection of any consequence appeared in the magnetic needle. When the insulating sheath, on the other hand, was imperfect, the electrical charge leaked through the imperfectness of the sheath, and so back to the opposite pole of the battery. In this way a current was set up in the wire to supply the leakage, and the magnetic needle was deflected from its position of equilibrum, the deflection being in proportion to the amount of the current. A strong deflection, therefore, would prove a sharp imperfection in the gutta percha, which would force a passage through an imperfectness which might be too slight to allow a weak current to make its way. During the progressive examination, every precaution was taken to protect the gutta percha, a low tension was also introduced into the circuit of the ring, so that its current flowed round continually, from pole to pole, through the strand. An insulated bell was also placed in the circuit, that any break of continuity might be instantly detected, and the bell would sound. Another bell instrument was so arranged that it was rung whenever the current from the five hundred cell battery began to run, in consequence of electrical leakage, with undesirable speed. The feeble battery in the circuit ran its bell whenever the circuit was broken. The strong battery out of the circuit rung its bell whenever an onflowing current was set up through the strand, in consequence of the insulating sheath being unable to retain the charge.

The series of experiments the very remarkable discovery was made, that the insulating power of gutta percha is very materially affected by temperature. A high temperature seems greatly to impair its insulating capacity, and the recent experiments performed in the laboratory of Mr. Janvier have only confirmed that statement. The results were confirmed by Captain Dayman of the Cyclope, who have enabled him to determine the deep-sea temperature over a very considerable range, and are abundantly confirmatory of this fact.

The separate lengths of manufactured core were then joined into a single ground wire, and a very strong insulating material being at all injured by the force applied.

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aid of hot irons. In case of the core on each side of the joint being at any time so dragged that the ends of the strand were broken asunder, this outer investment of wire would unroll spirally without being detached from the strand. Thus the electric continuity of the strand would be preserved even when the strand itself was severed.

Every two miles of the completed core were wound upon channelled drums with deep flanges, iron shot at the rim, so that they could be rolled about and made to perform their own locomotion. When the contents of these drums were used up, another was substituted. The core, thus twisted and pitched, was attached to the outgoing core of the compressed cable, and so the contents were unrolled from the drum as the external metallic wires were spun round the core. During the process the work is performed by a large pair of large pitch and tar, was compactly wound the core to act as a bed for the external metallic sheath. Then eighteen strands, each of seven wires of charcoal iron, were twisted firmly round the core. The strands and the cable were made by precisely analogous machinery. A large horizontal table, containing seven bobbins on the circumference in the case of the strand machine, and eighteen in the case of the closing or finishing machine, was whirled round by steam power with great rapidity. A central wire, or the core, was drawn up the table by means of a heavy rope, which was invested with a twisted whorl of wires or strands, given off from the bobbins as the table revolved. The strands were used, in completing the cable, instead of solid wires, because by this means every part of the strand was brought into contact with the material used, were obtained. The external investment of iron was solely designed to protect the coated core from mechanical violence during the act of submergence, and to confer upon it a convenient amount of weight for effecting its descent from the surface of the sea.

Each strand-machine, during the manufacture of the cable, was worked day and night, and in twenty-four hours spun ninety-eight miles of wire into fourteen miles of strand. The several strand-machines at work simultaneously spun a cable twenty-three miles in twenty hours and a half, or into 204 miles of strand. As much as thirty miles of cable have been made within twenty-four hours. At one time all the wire-drawers in England proved to be unable to supply the ever-increasing demands of the machinery, and the works had to pass for a short space. The entire length of wire, iron and copper, spun into this wonderful structure, amounts to 3,328,500 miles; a length sufficient to encircle the earth thirteen times! The completed cable weighed from nineteen hundred to two thousand pounds per mile. The quantity of copper used, was a little more than two hundred pounds, and a certain portion of the weight would necessarily be borne by friction against the particles of the water as the rope sunk; it was anticipated that the cable would never, under any circumstances, be required to meet a strain of more than one ton and a half. The Atlantic cable is to be worked at the bottom of the sea by means of electro-magnetic currents called forth by an instrumental agency of a somewhat complicated kind. First and foremost in this agency, as the primary source of the working influence, stands Whitehouse's "Perpetual Maintenance Battery." This battery consists of large plates of platination silver, and amalgamated zinc, mounted in cells of gutta percha. There are several plates, both of silver and zinc, in each cell, and they are separated by a technical bar of mica at the bottom of the cell, and all the silver plates hang upon a similar bar at the top of the cell, so that there is virtually but a single stretch of silver, and a single stretch of zinc in operation. This arrangement is made because it enables any portion of either silver or zinc to be removed for repair or renewal without stopping for a moment the operation of the battery. As any one lamina becomes imperfect, it can be taken out from its groove, and replaced. Each cell contains two thousand square inches of active surface, the amount of current that each can produce is 4,500 milliamps, therefore the total output of the whole battery will be of the magnitude of a thousand million amperes. Since it is a very solid and heavy instrument, it is necessary that all the parts be carefully ventilated in order to prevent accumulation of gas. The temperature of the water where the cable is laid is so high that the battery is very rapidly heated, and the gases thus formed would be dangerous to the life of the animal. The Atlantic cable is supplied with a "drum" which is a very strong metal cylinder, and is used for the purpose of receiving the cable whilst it is laid in its proper position. One end of this cylinder is fixed and serves as a point of support, while the other end is free and can travel. The "drum" is actuated by the temporary magnet. The pole of the permanent magnet is attracted by the south pole of the temporary one, and vice versa; so that as the polarity of the

screws burn with vivid scintillation. These brilliant effects are, however, inconvenient in one particular. They are produced at the expense of the apparatus. The metallic surfaces from which they are emitted, are rapidly burned away during their continuance. In order, as far as possible, to alleviate this injurious effect, the act is made and broken, during the transmission of electrical signals, by means of a key presenting a very large surface of metal. A horizontal bar, flattened at the top, turns backwards and forwards pioetways, and tills its edges against twenty flat brass springs similarly flattened and kept to the same plane by means of washers on each side. A constant slight leak of the current is also continually maintained through a curl of platinum wire placed in water. By this contrivance the injurious force of the electric current is very much diminished.

The cost of maintaining this magnificent ten-ton ship of Industry at work does not exceed a shilling per hour.

But it has been stated that the voltaic current is by no means a fleet message compared with other agents which are in use at the command of the electrician. Consequently it is not the electric stream generated in this mighty battery which is designed to be actually sent across the Atlantic on the performance of telegraphic service. This primary power is only used to call up and stimulate the energy of a more speedy agent to do the actual conveyance. This auxiliary is transmitted to a piece of complicated apparatus known as Mr. Whitehouse's "Double Induction Coils." These coils are arranged in pairs, and each coil consists, first, of a thick metallic tube, coated on the outside of it with a sheet of gutta percha enveloping the bar; next of several miles of comparatively fine silk-covered copper wire, coiled round the gutta percha sheath and bar; and finally of a mile and a half of silk-covered coarser copper wire coiled round outside the inner coil. These wires are employed to make the communication or connection. Now the inside iron bars, here, are intended to be made into temporary magnets by the action of electrical currents circulating through the coils. The outer coil of coarse wire carries the battery-current from the primary generator, and the inner coil, which is produced in a coil, is the primary or generating coil. The inner coil of finer wire has a new independent current set up in it by the instrumentality of the temporary magnet; as the primary current makes a magnet, so the magnet makes a secondary current in the previously quiescent coil, and this secondary and magnetically induced current it is which is sent off brisk enough to perform the work of rushing across the Atlantic. This independent secondary current is therefore the transmission-current on which the mechanical effect which is produced in the telegraphic circuit depends. The proper term for the current which is produced in the coil at the receiving end, and is called the secondary current, by which the telegraphic messages are conveyed, is the "transmission-current." In the Atlantic cable, this transmission-current is rendered harmless by the size and extent of the cable, and its success has been so complete that it has been necessary to add to the original cable a second, called the "return-line" wire, and to use a "drum" to wind the wires on as they are laid on the bottom of the sea.
The temporary magnet is reversed, the permanent magnet is caused to traverse. When it traverses one way, it opens the outlet of the local battery by effecting a contact and causes it to print; when it traverses the other way it shuts off the current of the local battery, so that it is constrained to keep itself reversed.

It is the peculiar advantage of this relay-instrument (as it is called) that the temporary magnet has no other work to do than to turn the permanent magnet upon its almost frictionless pivot. It has no spring to overcome, such as is more commonly employed in the class of instruments. The arrangement is so sensitive that the apparatus may be put in action by a fragment of zinc and a sixpence pressed against the tongue. These relays may indeed be ordinarily heard clicking along the telegraphic instruments, and it is common in large telephone offices when the large induction-coils are in operation within a few feet of them, actually doing a little business on their own account, although not in communication with any current, and transmitting the same signals and messages as those which are being forwarded through the agency of the induction-coils.

As the poles of the induction-coil magnets are reversed, the poles of the relay-magnets are actuated differently. Mr. Whitehouse has made the instruments even more exquisitely delicate by applying a second permanent magnet, so that it complements in the sense of like poles to increase and diminish the attraction acting on the working magnet, either way.

When the printing battery is brought into operation by the instrument just described, it records by the agency of one of Professor Morse's telegraphic instruments. A ribbon of paper is unrolled from a hollow cylinder by a train of clock-work, and as it is unrolled, a sharp style, magnetically actuated, indents a series of dots or lines upon the paper. When the style is pricked down, but for an instant, it is a dot that is impressed. When it is kept down for more than an instant a lengthened line or dash is left, because the paper ribbon is being drawn along beneath the style. In order that the style may be magnetically controlled to inscribe the Morse characters, it is held up by a spring which is not in action, and drawn down by a temporary magnet formed by the printing battery current, when in operation. A soft iron bar, enveloped by a coil of the printing battery wire, is stronger than the spring when it becomes a magnet, and draws it down.

The dot and dash-code of Professor Morse is adopted for the Atlantic service, because there is but one wire in the cable, which must be made to express, at least, all the letters of the alphabet, and all the numerals; different combinations of the dot and dash can be readily caused to express this; thus dot and dash, — is taken to signify a; . . . to signify b; , —, for c; ;; for d; c e so on. Mr. C. Bight has patented a very ingenious piece of apparatus in which the Morse characters are given symbolically, by symbols issuing from a free and a muffled bell. It is possible that this apparatus will some day be adopted by the Atlantic Company for their service.

Her Britannic Majesty's Government granted to the Company the use of the fine 31-gun ship Agamemnon for paying out one half of the cable into the Atlantic, and commissioned the paddle-wheel frigate Leopard to act as its tender. The United States Government sent over the magnificent new heavy frigate Constitution to carry the other half, with the paddle-wheel steamer Susquehanna for a tender. The Agamemnon proved to be singularly adapted for its work in consequence of having one square space as a hold, 49 feet across and 20 feet deep. In this space the 1200 miles of cable was paid out in one day, the cable being singularly coiled. The Niagara was not by any means so well adapted for the service, and had to be considerably altered in her internal arrangements after she came over to England, the cable being loaded, and then being distributed into three or four distinct coils. This was done by having the cable payed out, planned that the cable should come up from the hold of the ship, sweeping round a central block occupying the width of the coil, and then wound out and in over four grooves cut to a central core together by cogs, finally passing along a short distance above the poop-deck, and plunging over a fifth sheave, resting over the stern, into the sea. A friction drum, also geared to the sheaves, was embraced by block and tackle, and powerful screws, so that it could be gripped more or less tightly whenever occasion arose. Provision was also made to register electrically the speed with which the pay-out vessels moved through the water, the rate at which the cable was payed out, every instant, and the strain which was thrown upon it. Electrical signals, too, were to be made through the cable, from end to end, every second, to prove the maintenance of its continuity. The engineer's calculations fixed from four to five miles an hour as the rate at which the cable should be paid off. An external guard was placed over the screws of the vessels engaged in the work, to prevent the cable being injured in case any need should arise for returning upon the course to pick up signals sent from the opposite end of the cable. When the storm was past, the dropping being accomplished by means of very strong supplementary ropes kept ready for the purpose.

The end of the month of July was selected for the accomplishment of this wonderful enterprise, because Lieutenant Manly had ascertained, by the accumulation of a large series of observations, that the Northern Atlantic is in the most favorable condition for any work of the kind in this season of the year. There is then the least likelihood of trouble from ice, and the strength of the wind is never so great that it can be considered as a hazard. The wind is almost unknown at the period, excepting just off the western coast of Ireland. Lieutenant Manly also marked out the track the vessels ought to endeavors to take. Theoretically, the course lay off the coast of Newfoundland, and in the first instance, it was determined to use the great circle route. But all practical navigators are aware that it is altogether impossible to direct a ship along a true great circle track. Such a track would require the course of the vessel to be altered at an infinitely small amount at every successive instant. Whereas in steering by the compass no alteration of, course, to any thing less than half a point of the compass is actually trustworthy. Bad steering, unaccertainable sets of the current, and the change in the weather, made the ship have errors nearly approaching to this amount. Lieutenant Manly consequently planned a polygonal route from Valentia Harbour to Trinity Bay, in which there were only six changes of course, each one restricted to a quarter of a point of the compass, and in which the departure from a true great circle path was no more than eight-tenths of a nautical mile.

If one ship had sailed in the great circle route, and the other in the polygonal route, each moving at the same rate of speed, the error of the course of the vessel would be altered to an infinitely small amount over the whole way. The telegraph cable being laid in the polygonal route, and then hauled in by windlasses at each end, until it was reduced to a true great circle curve, each windlass would only have to wind in 300 fathoms of the cable. The entire length of the cable from Valentia Harbour to Trinity Bay would be 1834 statute miles. The liberal allowance of a superfluous length of 600 miles was therefore made to provide against unforeseen accidents.

In recent years very great improvements have been made in the process of deep sea sounding, chiefly in the first instance through American ingenuity and skill. Mr. Brooke, of the United States navy, has contrived a sounding apparatus, which proves very successful and manageable. The apparatus consists of a cannon-ball thrown upon an iron rod in such a way that when the rod strikes the bottom of the sea the cannon ball is detached from a pair of triggers and dropped, the rod being then drawn up with specimens of the bottom of the sea, which are preserved in very single form. Allowance is made for the extent to which transverse currents draw out the line during the descent of the plummet, based upon the known rate at which the plummet ought to descend in deep water. It appears from a large series of observations, deep water in the North Atlantic, that the depth of the bed of the Atlantic is very much, and very abruptly broken up; jagged peaks alternating with precipitous submarine valleys. The greatest depth of the Atlantic seems to lie to the south of the banks of Newfoundland, the sounding there indicating a descent of at least 3,000 fathoms. In the more northerly regions the depth is considerably less, especially between the parallels of 48° and 55° north latitude. There is one great zone of the earth, extending from east to west, in which the surface appears to be raised comparatively high. This zone marks the line in which the northern and southern water-heds meet, alike in the continents of America, Europe,
It is continued in the Northern Pacific through the Aleutian Islands, and it stretches at the bottom of the Atlantic, as a sort of organism from which brought up by the land to Cape Clear in Ireland, Newfoundland and the British Islands being really projecting extremities of the higher portion of the shelf. This platice rests precisely in the course along which the beds of the deep sea plummet prove to be so perfect notwithstanding their fragility, that there can be no doubt the depths where they lie are free from all kinds of mechanical disturbance, and so in the precise condition which must be the most conducive to the safe preservation of an electrical cable once deposited in their recesses. Lieutenant Berryman, of the United States navy, carefully sounded through the extent of this submarine plateau, and described it as being smooth and slightly inclined from north to south. The sounding boat had been revised those soundings shortly before the sailing of the expedition for the submergence of the cable, going over the same track again, and fully confirmed the general facts of the relatively slight depth of the plateau, and the abundant presence of diatomaceous ooze. The searching boats were directed to report a greater degree of density in the depths of different positions than Lieutenant Berryman had conceived.

On the 5th of August, 1857, operations commenced. There were present the *Agamemnon*, *Niagara*, *Leopard*, "Suspect", "Vulcan", "Mind," which were intended to assist in various parts of the operations. The shore-end of the cable was taken on shore from the "Niagara," by a number of boats. And then took place a ceremonious inauguration of the enterprise; the Lord Lieutenant of Ireland receiving the extremity of the cable, and drawing it into a tent where electrical batteries had been placed, on the beach of Valentia Harbour. The engineer was doomed, however, to a mortifying disappointment. A slight accident happened to the cable on the 6th, but this was repaired, and the ships proceeded. By the morning of the 10th they had got out 200 miles to sea, and the cable conveyed messages to and from the land and the ships with the utmost facility; the persons on shore following the history of the voyage hour by hour, and receiving the messages at the extremity of it. At the latest statement, 360 nautical miles, or 800 statute miles, of cable had been submerged; and, knowing that was far too much in proportion to the straight line distance, he concluded there was too much cable in the bag. The cable was thereupon rejected, and the ship of the engineer was therefore made; and this modification appears to have been usefully adopted by one of the subordinates. The cable was stretched too tightly; it was matted, and went to the bottom, at a depth of twelve thousand feet, equal to forty times the height of St. Paul's. Preparations are being made at this time, March 1858, for immediately resuming the attempt. The last portion of the cable has been replaced; and government ships of Great Britain and of the United States are under orders again to assist in this national enterprise.

Electrical Telegraphs now render useful service in several cities of America. In New York eight bell-towers are connected with each other, and with the central tower over the City Hall, and the new tower in the Narrows, and these form an alarm of fire. At Boston a comprehensive plan is acted on. A central station has been selected, in which the principal instruments are placed. Two wires take a very circuitous route from this station; one, ingeniously supported on a mast, is held to the central station by means of bell-towers in the city, where it sets upon machinery which strikes on a large bell whenever an impulse is transmitted through the wire; the other, much more extensive, proceeds to all the street or ward signal-stations in the city. At each of these signal-stations is a box containing a magnetic galvanometer, under the care of a keeper. If a fire break out in any part of the city, a message is sent to the nearest signal-station; the man transmits a signal to the central station, whence an electric impulse is sent to all the bell-towers in the city, the ringing of which conveys the required information. It is obvious that other public service, besides that relating to fire, may be assigned the electrical means. There are about fifty miles of wire in this telegraph at Boston. There seems every reason to believe that, now the telegraphic wires follow so many sub-way routes in the town, the glass tube will gradually be brought within the scope of the system.

**ELECTRICITY OF ORGANIC BEINGS.** Plants and animals, under certain circumstances, exhibit electrical phenomena. These however are not so constant or frequent as those observed on the bottom of the sea; but that is now known to exist between the great forces of nature, as Light, Heat, Chemical Action, and Electricity, it is perhaps matter of surprise that so few electrical phenomena are exhibited by organised bodies.

In Plants it appears that during growth electricity is developed. Pouillet filled several pots with earth, and placed in them different kinds of seeds, and then insulated them. During the process of germination no electric disturbance was discovered, but when the seeds began to sprout a gold-leaf electrometer had become separated at least half an inch from each other. Pouillet concludes that the vegetation on the surface of the earth must produce a vast amount of electricity, and be an active cause of its phenomena in nature. It has been observed that the use of wires in the bark and pith of a growing tree, they have obtained decided indications of the presence of a galvanic current. These exhibitions of electric disturbance are undoubtedly dependent on the chemical changes going on in the plant, and this is shown by the fact that in the use of a gold-leaf electrometer in nature representing another. Under the influence of heat and light the chemical and attractive forces are brought into play, and the motile force of the growth of the plant as well as electrical phenomena are the result.

In the Animal kingdom the phenomena of the presence of electricity is afforded during the activity of the vital functions. Matteucci has observed a considerable deflection of the galvanometer when wires were connected with the muscles and nerves of the human body. The electricity is excited by the movements of the human body. This is made evident by rubbing the feet on a woolen rug, when, on the application the hand to a gold-leaf electrometer, the presence of electric disturbance is indicated. Some persons are more liable to this development than others, and Dr. Carrel's experiments on dogs and other animals prove the existence of this current. These and other experiments of the Matteucci and Du Bois-Raymond have shown not only that free electricity is developed in animal bodies, but that there is a true galvanic current both in the muscles and nerves. Galvani attributed the movements, first observed by his wife, induced in a frog's leg by wires placed on the ear and body. Volta showed that the movements observed by Galvani were dependent on the chemical action developed in the muscles. Matteucci observed the peculiar sensitiveness of the nerves and muscles of the frog to galvanic action, and made use of the leg, prepared as a galvanometer, in many of his experiments. The mode of using it was simply to take the leg of a recently-killed frog with the crural nerve dissected out of the body, but remaining in connection with it. The leg was then inclined in a glass tube, covered with an insulated wire, and the terminal of this open end. When two points of the nerve thus prepared are brought in contact with any two substances in a different electrical state, the muscles of the frog's leg are thrown into contraction. By this galvanic test, the frog's leg was enabled to detect currents of electricity in the muscles of animals, by cutting into them, and placing one extremity of the nerve deep in the wound and the other at its tips. The experiments of Matteucci were followed up by Du Bois-Raymond, who has recently concluded that negative or positive currents may be observed in any limb of any animal whether cold or warm-blooded. These currents in some limbs are directed downwards, in others upwards. They are of different intensity in different limbs; but their intensity and direction are always the same in the same limb of different
individuals of the same species. 2. The electro-motive action on which these currents depend does not arise from the union of the two transverse sections, or the 3. The currents are produced by the muscles. If any undissected muscle of any animal be brought into the circuit longitudinally, the discharge is instantaneously cut off, and the direction of which depends on the position of the muscle. The current of the whole limb is nothing but the resultant of the partial currents which are engendered by each muscle of the limb. It is therefore a 'muscular current.' 4. The law of discharge is this: 'Any point of the natural or artificial longitudinal section of the muscle is positive in relation to any point of the natural or artificial transverse section.' 5. By means of the above-mentioned phenomena it is asserted that the transverse section appearing in one instance an upward one, in another a downward one, which occurs according as the upper or the under of the two transverse sections is made to touch one of the ends of the galvanometer wire, whilst the other end is applied to the longitudinal section of the muscle. This is true even as regards shreds of muscle consisting of only a few primary fibres, and such as only admit of observation by the microscope. The nerves are possessed of an electro-motive action, but it is peculiar and not to be compared with that possessed by the muscles. Whilst still in organic connection with the muscles, and forming part of a circuit in which the muscles give rise to a current, the nerves simply play the part of an inactive conducting body, provided their own current be prevented from reaching the galvanometer.

There are certain animals which possess the power of accumulating electric force within their bodies, and of discharging it at will in a violent form, and with the exception of some insects and Mollusca which have been said (though this is done) to communicate sensible shocks, these animals are all included in the class of Fishes. About seven species of this class, belonging to five genera, are known to possess electric properties, and it is curious that these genera belong to the same family. From this it appears, that though each has a limited geographical range, one species or other is found in almost every part of the world. Thus, the three species of Torpedo, belonging to the Ray tribe, are found on most of the coasts of the Atlantic and Mediterranean, and sometimes so abundantly as to be a staple article of food. The Gymnotus, or Electric Eel, is confined to the rivers of South America. The Sihurus (more correctly the Malapterurus), which approaches more nearly to the Salmon tribe, occurs in the Niger, Benue, and the Nile. The Torpedo Club, or Electric Ray, is found in the Indian Seas; and the Tetradon (one of the genus allied to the Diodon, or Globe-Fish) has only been met with on the coral banks of Java, one of the Comoro Islands. These fishes have been variously called the Salmon, the Ray, the Electric Ray, and the Electric Eel, but it seems probable that the phenomena which they exhibit, and the structural peculiarities with which these are connected, are essentially the same throughout.

The peculiar characteristic of all is the power of giving to any living body which touches them a shock resembling in its effects that produced by the discharge of a Leyden jar. This is of very variable intensity in different species and individuals, and at different times. The Gymnotus will attack, and paralyse horses, as well as kill small animals, and the discharges of large fish (which are 30 feet long) sometimes prove sufficient to deprive men of sense and motion. The effects of the contact of the Torpedo are less severe, and soon pass off; but the shock is attended with considerable pain whenever the fish is vigorous. The electric organs appear to be charged and discharged to a certain extent at the will of the animals. Their power is generally exerted by the approach of some other animal, or by some external irritation; but it is not always possible to call it forth, even when conditions are apparently fulfilled. A fish with the general feebleness of the system, though sometimes a dying fish exerts considerable power. All electrical fishes have their energy exhausted by a continued series of discharges; and when they do not pass, however weakly South America to collect a number of wild horses and drive them into the rivers, in order to save themselves, when they pass, from being injured by the fish. If excessively exhausted, the animals may even die; but they usually recover their electrical energy after a few hours rest.

The Torpedo, from its proximity to European shores, has been most frequently made the subject of observation and experiment; and the following are the most important results from those experiments:—

1. That the shock received by the organs of sensation in man is really the result of an electric discharge, has now been fully established. Although no one has ever seen a spark emitted from the body of one of the fish, it may be easily shown that it is electric, and that these animals send its discharge through a slightly interrupted circuit. The galvanometer is influenced by the discharge of the Torpedo, and chemical decomposition may be effected by it, as well as magnetic properties. In communication with the professor, a proper reception of the shock, that two parts of the body should be touched at the same time, and that these two should be in different electrical states. The most energetic discharge is procured from the Torpedo by touching the belly, and passing the hand around the side, so as to make the dorsal surface being positive, and that of the ventral negative; and by this means the galvanometer may be strongly affected, every part of the back being positive with respect to every part of the opposite surface. When the two wires of the galvanometer are applied to the corresponding parts of the two sides of the same surface, no influence is manifested; but, if the two points do not correspond in situation, whether they be on the back or both on the belly, the index of the galvanometer is moved, and it is found that the discharge to the electric organ appears to be the source of the difference in the relative state of different parts of the body; those which are near to it being always positive in respect to those more distant. Dr. Davy found that, however much Torpedoes are used to the discharge, they never become insensible to single non-sensory shocks at all, and he states that, when one surface only is touched and irritated, the fish themselves appear to make an effort to bring the border of the other surface, by muscular contraction, into contact with the offending body; and that this is even done by fish in London to the Plates of metal, the edges of which are in contact, no shock is perceived by the hands placed upon them, since the metal is a better conductor than the human body; but if the plates be prevented from coming in contact with each other, the sides of the body, the hands being applied to them, the discharge is at once rendered perceptible, and it may be passed through a line formed by the moistened hands of two or more persons, the extremities being brought into relation with the opposite plates. The electrical phenomena of the Gymnotus are essentially the same with those of the Torpedo; but the opposite electrical states are found to exist, not between the dorsal and ventral surfaces, but between the head and tail; and it is most powerful when the connection is formed between these extremities.

It has been ascertained by experiment, that the manifestation of this peculiar power depends upon the integrity of the connection between the nervous centres and certain organs which are considered as the electric organs of the fish. These organs are of a flattened shape, and occupy the front and sides of the body, forming two large masses, which extend backwards and outwards from each side of the head. They are composed of two layers of membrane, between which is a whilish soft pulp, divided into columns by processes of the membrane sent off so as to form partitions like the cells of a honeycomb; the ends of these columns being directed towards the two surfaces of the body. The columns are again subdivided horizontally by more delicate partitions, which form each into a number of distinct cells; the partitions are extremely vascular, and are profusely supplied with nerves, the fibres of which seem to break up into minuter fibrille to form plexuses upon these membranes. The fluid contained in the electric organs forms so large a portion of the body, that the specific gravity of the mass is only 1.026, whilst that of the body in general is about 1.060; and from a chemical examination of its constituents, it seems to be little else than water, holding one-twelfth part of albumen in solution, with a small quantity of the Tetrabromide of Barium. The electric organs are essentially the same in structure, though differing in shape, in accordance with the conformation of the animal; they occupy one-third of its bulk, and run along nearly its whole length; but are formed of two different parts, one much larger than the other. The primary mass is less unusual, but are much longer; for they run in the direction of the length of the body, a difference which is productive of a considerable modification of the character of the discharge. In the Sihurus there is not any electrical organ so definite as those just described; but the thick layer of dense cellular...
time, which completely surrounds the body, appears to be subservient to this function; it is composed of tendinous fibres interwoven together, and of an albuminous substance contained in their interstices, so as to bear a close analogy with the cellular partitions in the special organs of the *Torpedo* and *Gymnotus.* The organs of the other known electrical fishes have not yet come under the notice of any anatomist.

In all these instances the electrical organs are supplied with a mass of very great size, larger than any others in the same animals, and larger than any nerve in other animals of like bulk. They all arise in the *Torpedo* from a ganglionic mass situated behind the cerebellum, and connected with the medulla oblongata. It has been observed that these two organs arise in the second of them from the cruciate in close proximity with the fifth, and have been regarded as belonging to it, although their real origin is different; whilst, from the distribution of the third electrical nerve to the stomach, after sending its principal portion to the electrical organ, it would seem analogous to the eighth pair or pneumogastric.

The electrical nerves in the *Gymnotus* are believed to arise from the spinal marrow alone; and those of the *Silurus* are supposed to arise from the same nerve, and to be connected with the medulla oblongata. The integrity of the nerves is essential to the full action of the electrical organs. If all the trunks be cut on one side, the power of that organ will be destroyed, but that of the other may remain uninjured. If the nerves be partially destroyed, a part of the electric power may be recovered by the portion of the organs still in connection with the centres. The same effects are produced by tying the nerves as by cutting them. Even slices of the organ entirely separate from the body, kept by nerve fibres, may retain the electrical properties. Discharges may be excited by irrita-
tion of the brain when the nerves are entire, or of the part of the divided trunk distributed on the organ; but on de-
stroying the electric lobe of the brain the electric power of the animal ceases entirely; a place is usually taken by those centres which are removed by imperilling the electric organs. Poisons which act violently on the nervous system have a striking effect upon the electric manifestations of these fish; thus, two grains of muriate of morphia were found by Matteucci to produce death after about ten minutes, during which time the discharges were very numerous and powerful; and strychnia also excited powerful discharges at first, succeeded by weaker ones, the animals dying in violent convulsions. When the animals were under the influence of strychnia it was observed that the electrodes of the organs did not answer to the table on which the animal was placed being sufficient to produce this effect. If the spinal cord were divided, how-
ever, no irritation of the parts situated below the section called into action the centres above; and it is certain that the electric power is suspended when the *Torpedo* is plunged into water at 33°, and is recovered again when it is immersed in water of a temperature from 68° to 66°; and that this alternation may be repeated several times upon the same fish. But if the temperature be raised to 68° the *Torpedo* soon ceases to live, and dies while giving a great number of violent discharges. (Carpenter.)

From these facts it is evident that the electric force is developed as the result of nervous agency. From this it has been supposed that the electric and muscular forces are identical. This, however, is not more probable than that the contractile force of the muscles is identical with the nervous force. The best explanation of the pheno

Carpenter, Principles of Physiology, General and Compara-

**ELEOTRIS**, a genus of Acanthoperciform Fishes belonging to the family Gobidae. Like the Gobies the species have flexible rays in the fins, and a strong electric organ situated behind the vent, but they have the ventral fins separate and six gill-rays. The species are inhabitants of the fresh waters of warm countries, and conceal themselves in the mud of the natal river.

**E. domatricha**, the Sleeper, is a large fish. It is found in the West Indian marshes. Other species have been found in Africa, India, and the Mediterranean.

**EILDONE. [EILIDONE.]**

ELLENBOURGH. [CUMBERLAND.]

ELLENBOURGH, LORD. Edward Law was born November 16, 1760, at Great Salkeld, in the county of Cumber-
land. He was the fourth son of Dr. Edmund Law, bishop of Carlisle. He received his rudimentary education at the conventual schools of his native place, and was sent to Dr. Burn, an eminent Lea-
tician, who then resided at Docking in Norfolk. He was re-
moved thence in 1782 to the Charter-house School, London, and placed on the foundation. In 1788 he entered of St. Peter's College, Cambridge. After taking his degree of B.A. he removed to St. John's College, and was admitted to the Inner Temple. Having been called to the bar, and ac-
quired by a short preparatory practice the needful technical knowledge, he soon took his place among the chief members of that body. He was engaged as the leading counsel in the defence of Warren Hastings, 1788 to 1795, and in this famous trial acquired great distinction both as a lawyer and a speaker. In Westminster Hall he had Erskine and other able rivals to contend with, and never rose to the first lead of the case, but always remained the most popular in the Northern Circuit. His rise in the profession was remarkably rapid. In 1801 he was appointed attorney-general and knighted, and in the same year he was elected a member of the House of Commons. In April 1808 Sir Edward Law succeeded Lord Kenyon as lord chief justice of the court of King's Bench, and was created a peer by the title of Baron Ellenborough, ofEllenborough in Cumberland, by patent dated April 10th, 1808. He was afterwards made a privy councillor. In the House of Lords in 1805 he strenuously opposed any concession to the Roman Catholics. On the trial of Lord Melville in 1806 Lord Ellenborough voted against him. In 1813 he was nominated one of the com-
mis sioners to inquire into the conduct of the Prince of Wales. In 1816 he was the leading counsel in the trial of Lord Cochrane, and in 1818 on the trial of Hone. [Hone, William, S. i.] In November of the same year he retired from the bench. He died December 13, 1818, at his residence in London. He married in 1802, and was succeeded in the title by his eldest son, who is now Earl of Ellenborough. Lord Brougham, in his *Historical Sketches of Statesmen,* makes the following remarks on his character as a judge:—"The Term Reports bear ample testimony to the vigour of this eminent indi-
nual's capacity during the sixteen years that he filled the first place among the English common-law judges. . . . He was somewhat irascible, and sometimes even violent. But no one could accuse him of the least partiality. His decisions were prompt and just, and he was much to trample overbearingly on the humble as to crouch meanly before the powerful. . . . He despatched business with great celerity, and for the most part with success. But causes were not sifted before him with that care and accuracy which the duties of the office required, nor suffered to bring forward all they had to state with that fulness and freedom, which alone can prevent miscon-
untenance, and ensure the due administration of justice."

ELLESMERE, EARL OF. LORD FRANCIS LIVESTON GOWAN was created Earl of Ellesmere on the death of his father, the second son of the first Duke of Sutherland, and brother of the present Duke. He was educated at Eton College, and afterwards at Christ Church, Oxford. He left the university in 1820, in which year he was called to the Bar at the New Inn. He married in 1826, and was times disenchanted by the Reform Act. At a time when the German language was little studied in England he distinguished himself by a translation of the *Faust* of Goethe, in two volumes, which was more than
translated from the original, which was written in 1843, and published in 1844, as "The Autobiography of Baroness Sutherland of Eoebton."
everywhere a thoroughly honest hatred of oppression, and fellow-feeling with the oppressed and suffering. With quite a Crabbe-like familiarity with the poverty of the poor, they displayed a far warmer, deeper, and more genial sympathy. The wrath and the pathos, too, uttered in the most impassioned and the most direct words, were yet conveyed in genuine music, which made its way at once to the heart.

Wings and attend anterior art, the He Corn-

dramatic epigrams, during to the the Language architectural partnership, this, burning felt the the design on his first music-hall laid the design for his office at Mortlake, in Sir Mr. Cockrell, who also designed the sculpture of the pedestal.

To understand the importance of Elmes's great work, it would be necessary to review the history of architecture, and especially the adaptation of Greek models, during the course of some years preceding the date of the St. George's Hall design. The proper use of ancient models had been completely lost, and even at the time to seek architec-true. In many parts of the kingdom buildings were erected, supposed to be classical, but which realised neither art nor the lower quality, the very imitation. Thus an idea had begun to prevail that the Greek system was so limited in its scope, that no satisfactory type of modern buildings could be in itself the cause of the failure in certain ambitious pro-
ductions. Elmes however repeated the proof that it was possible to use the works of preceding minds, and yet to realise the grandest new conception. Considered as to the attributes of art, Elmes's work is more Greek than many modern buildings which may exhibit even accurate reproduction. The design may well be claimed by this country as amongst the noblest efforts of architecture in Europe.

After years spent most worthily in the pursuit of art, Elmes had not realised anything commensurate with the ex-
tent and merit of his exertions. An average of 4000 a-year, subject to deductions for travelling, clerks, office and other expenses, would have been expected in that one. He had received from that work which forms the chief adornment of a rich provincial town; and after his death a subscrip-
tion was raised to provide a moderate income for his wife and child.

ELODIANS. [Toxotess.]

EMBERIZIDE, a family of birds belonging to the order Insectivora and the tribe Corvidae. The most distinguishing genus of the family is Emberiza. It comprises however other genera, the general relations of this family are given under Fauquierides. We shall confine ourselves here to the British genera of this family known under the name of Buntings.

Electrophanes.—Bank short, thick, conical, the edges of both mandibles slightly curved inwards; beak able to be used smaller than the lower, with a small palatal knot. Nostrils basal, oval, partly hidden by small feathers. Wings long and pointed; the first and second quill feathers of nearly equal length, and the longest in the wing. Legs with a taral of moderate length; anterior toes divided; lateral toes equal in length; hind toe strong; claw elongated, and nearly straight.

Lappetidae (Gould), the Lapland Buntings, is the Emberizinae lapponica and E. cucullata, first mentioned.

Though a native of the arctic regions, Mr. Rayrell records five instances of its being taken in Great Britain. It is found in Siberia and near the Urallian chain. Towards winter a few migrate as far as Switzerland. It inhabits the large islands of the Baltic, Greenland, and Iceland in sum-
mer, and thence westward to Hudson's Bay. Sir John Richardson says, that about the middle of May, 1827, they appeared in very large flocks at Carlton Hoose, and a few days later made their appearance at Cumberland House. The ages are usually seven, and of a pale ochre-yellow spotted with brown.

P. nicolai, the Snow-Bunting. It is the Emberiza glacialis, E. monica, E. nicola, and E. ustulata of authors; and the Tawny-Mountain- and Snow-Bunting of English writers. It was at one time supposed they were different species, but this arose from the great variety of plumage to which these birds are subject. The predominant colour of their plumage is white, hence the name Snow-Bunting. This bird arrives in the arctic region in the beginning of October, and extends from the north of Scot-
land to the south of England. This bird is rather larger than the last.

Emberiza—Beak conical, strong, hard, and sharp-pointed; the edges of both mandibles curving inwards; the upper mandible narrower and smaller than the under one, and its roof furnished with a hard bony and projecting palatal knob. Nostrils basal and round, partly hidden by small feathers at the base of the mandibles. The yellow of the back of the plumage is shorter than the third, which is the longest in the wing. Feet with three toes before and one behind, divided to their origin; claws rather long, curved, and strong.

E. melitens, the Common Bunting, is the most common species of this genus. It remains in the British Islands
throughout the year; and on account of its very familiar presence in corn-fields, is frequently called the Corn-Bunting. It builds its nest in April, and lays four or five eggs of creamy white, marked with purplish streaks and spotted with dark purple-browns. It feeds on the seeds of the grasses, of the Polygona, of sorrels, and of cereal plants; also on Coleopteraeous Insects.

In both sexes of this species the upper parts are of a light yellowish-brown streaked with blackish-browns, each feather being of that colour along the shaft; lower parts pale yellowish-gray, each feather of the fore neck tipped with a triangular spot of brownish-black, the fore part of the breast and flanks streaked with more elongated and fainter spots.

E. schenicus, the Reed-Bunting. It is also called, according to MacGillivray, Black-Headed Bunting, Reed-Sparrow, Water-Sparrow, Ring-Bunting, Ring-Bird, Ring-Fowl, and Ginch. It frequents marshy places, where it is seen perching on willows or bushes. It feeds on insects, seeds, and small Mollusca. The nest is placed among aquatic plants, and is composed of stalks and blades of grasses, bits of rushes, and the like. The eggs are four or five in number, of a yellowish-gray, with tortuous or angular lines, and irregular spots of black. This bird is easily distinguished from the other species by its black head and white throat.

E. citrinella, the Yellow Bunting or Yellow Ammer. It is also called in English Yellow Yelling or Yolding. Yellow Yowley, Yellow Yite, Yeldock Skute, and Devil's Bird. It is a permanent resident in Great Britain, in cultivated and wooded districts, where it is well known. The hack and wings are bright red, the central part of each feather brownish-black. The whole of the grassland is twigs, neatly lined with fine grass, fibrous roots, and hairs: it is placed on the ground or in the lower part of a bush. It lays four or five eggs purplish-white, marked with linear and angular streaks and a few irregular dots of black.

E. Circus, the Cirl-Bunting. This bird is not so common in this country as the last, which it greatly resembles. It was first distinguished as a British bird by Colonel Montagu. It is a native also of the south of Europe, and is more frequent in the England than in Ireland.

E. hortulana, the Ortolan Bunting. A very few specimens only of this bird have been taken in England. It is common in the southern countries of Europe, and migrates as far northward as the Baltic. (MacGillivray, Manual of British Birds; Yarrell, History of British Birds.)

EMISSION. One of the most remarkable facts in the history of Great Britain is the rapid increase of the population in the 19th century, which is pointed out in the article Census. While the population of France and Germany has increased within the last fifty years in a very small degree; while in Spain, Portugal, and Italy it has probably decreased; Great Britain has increased from 10,800,000 in 1801, to 30,900,000 in 1851, and to 40,900,000 in 1861; and in the middle of 1866, the Registrar-General estimated the population of England and Wales alone at 39,044,000: Ireland is omitted, as there was no census of 1801. In addition to this increase, swarms have been thrown off to which the ancient migrations from the North are insignificant in their total amount, though the emigration has been less striking from its being not an irruption but a gradual process. In forty-two years, from 1815 to 1856 inclusive, during which among an average emigrant has been taken, 4,470,219 persons, male and female, have left the shores of the United Kingdom; and these have been enabled to form what may now be termed three mighty empires, subordinate to our own, in Australia, New Zealand, and South Africa; independent of the branch streams which have flown off to Ceylon, the West and East Indies, Guiana, and other British possessions. The United States of America is the only domain that can afford any considerable emigration, and that is indebted to it for 2,703,782 persons, who have proceeded thither, the greater proportion of whom have been from Ireland, and chiefly from the years beginning with 1847. The annual average of emigration from Ireland, 1846, was 161,255; from 1847 to 1856, it was 279,816. It should be added here, however, that from 1815 to 1824 no records were kept of the emigration to South Australia and New Zealand; but it was certainly under £10,000 a year. In the ' Penny Cyclopaedia' (vol. ix. p. 377; article Emigration), we gave a table of emigration to 1856, which we now complete to 1857:

In 1857 the total number of emigrants from the port of Liverpool only, was 155,052; of these 9788 were for the North American colonies; 106,918 for the United States; 22,851 for Australia and New Zealand. We have now data for other places. Of these emigrants England supplied 60,689; Scotland, 6191; Ireland, 71,195; and various foreign countries, chiefly Germany, 6414. The emigration to Australia was principally English; that to the United States principally Irish.

Many emigrants, however, proceeded to the North American colonies by New York, and no account is taken of the passage either way on the borders between them and the United States. The proportions thus computed are probably more fertile than at home. We give the latest returns of the population of these colonies which are mainly occupied by a British population, our youngest and most vigorous:

<table>
<thead>
<tr>
<th>Country</th>
<th>Total Males</th>
<th>Total Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>901,489</td>
<td>1,016,990</td>
<td>1,918,479</td>
</tr>
<tr>
<td>New Brunswick</td>
<td>80,529</td>
<td>83,744</td>
<td>164,273</td>
</tr>
<tr>
<td>New York</td>
<td>90,069</td>
<td>96,292</td>
<td>186,361</td>
</tr>
<tr>
<td>Prince Edward's Island</td>
<td>2,239</td>
<td>2,410</td>
<td>4,649</td>
</tr>
<tr>
<td>Newfoundland</td>
<td>32,374</td>
<td>34,290</td>
<td>66,664</td>
</tr>
<tr>
<td>Bermuda</td>
<td>4,577</td>
<td>4,663</td>
<td>9,240</td>
</tr>
</tbody>
</table>

The numbers given for Canada are from the Census of 1851 for Western, and the official return of 1852 for Eastern Canada; the estimated numbers of both in January 1857 were 2,600,000. For New Brunswick they are taken from the Census of 1851, and the official returns of 1853. For Nova Scotia, from the Census of 1851. For Prince Edward's Island, from the Census of 1851, and the official return of 1857 at 12,000. All have increased since the returns. For Newfoundland the numbers are taken from the Census of 1840, and in 1857 the increase was estimated at 10,000. For Bermuda the authority is the official return of 1853.

<table>
<thead>
<tr>
<th>Country</th>
<th>Total Males</th>
<th>Total Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>New South Wales</td>
<td>232,464</td>
<td>226,097</td>
<td>458,561</td>
</tr>
<tr>
<td>Victoria (Cal Port Phillip)</td>
<td>201,492</td>
<td>202,754</td>
<td>404,246</td>
</tr>
<tr>
<td>South Australia</td>
<td>30,433</td>
<td>30,542</td>
<td>60,975</td>
</tr>
<tr>
<td>Western Australia</td>
<td>8,589</td>
<td>8,565</td>
<td>17,154</td>
</tr>
<tr>
<td>Tasmania</td>
<td>36,506</td>
<td>36,369</td>
<td>72,875</td>
</tr>
<tr>
<td>New Zealand</td>
<td>21,055</td>
<td>21,055</td>
<td>42,110</td>
</tr>
<tr>
<td></td>
<td>231,379</td>
<td>228,704</td>
<td>450,083</td>
</tr>
<tr>
<td></td>
<td>497</td>
<td>497</td>
<td>994</td>
</tr>
</tbody>
</table>

These returns all come down to a recent date, 1855-56, except New Zealand, for which the numbers are from the Census of 1851, and is exclusive of military and aborigines.

In Tasmania are included 7740 convicts, 895 troops, and 19 aborigines. The population of Victoria on Dec. 31, 1855, only three months later than the above return, was estimated at 313,379; and on Dec. 31, 1857, at 4,057,000.

<table>
<thead>
<tr>
<th>Country</th>
<th>Total Males</th>
<th>Total Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case of Good &amp; Western Division</td>
<td>71,011</td>
<td>65,807</td>
<td>136,818</td>
</tr>
<tr>
<td>Eastern Division</td>
<td>49,047</td>
<td>40,947</td>
<td>90,994</td>
</tr>
<tr>
<td></td>
<td>4,112</td>
<td>3,473</td>
<td>7,585</td>
</tr>
</tbody>
</table>

The returns of these colonies are for 1853 and 1854; and in Natal the numbers given are exclusive of 12,988 settled natives.

In these three divisions of the British colonies, there are non-representative governments, the privilege of self taxation, and the right of a free press; in short, a complete reproduction of the British Constitution. To other colonies, especially to British Guiana and some of the West India Islands, the emigration has been considerable; but as the emigrants become mixed with an older and in some cases ....
In and but general a royal best much for business enabling ship, rules their mouth, information Commissioners. that grants me terms, the latest in the 18 and 10 Vict. cap. 119, passed in 1856. Its objects are to regulate the number of passengers in each ship, and to provide for their proper accommodation on board; to ensure a proper supply of provisions and water for their maintenance, and against personal injury, to secure a sufficient number of boats in case of accidents; and to protect emigrants from the numerous frauds to which at various stages of their undertaking their helplessness and inexperience expose them. If the ship does not sail on the day appointed in the agreement the Passenger's Act compels the captain to victual the emigrants just the same as if the voyage had commenced; and they are entitled to remain on board forty-eight hours after the ship reaches her destination.

As a further protection to emigrants, and to enforce the provisions of the Passenger's Act, government emigration agents are appointed for the ports of London, Liverpool, Plymouth, Southampton, Glasgow and Greenock, Dublin, Cork, Belfast, Hull, New York, Greenock, Sligo, Londonderry, and Galway. These officers act under the immediate directions of the Colonial Land and Emigration Commissioners. They procure and give gratuitously information as to the sailing of ships, and means of accommodation for emigrants; and when applied to in this way they see that all agreements between ship-owners, agents, or masters, and intending emigrants, are duly performed. They also see that the provisions of the Passenger's Act are strictly complied with, viz., that passenger-vessels are sea-worthy, that they have provided a sufficient supply of provisions, water, medicines, &c., and that they sail with proper punctuality. They attend personally at their offices on every weekday, and afford gratuitously all the assistance in their power to emigrants arriving from the tropics, and who are not at home, and to obtain redress where oppression or injury has been practised on them.

In the colonies there are Government Emigration Agents at the following places: Canada—Quebec, Montreal, Toronto, and Hamilton. New Brunswick.—St. John's, St. Andrew's, Chatham (Miramichi), Bathurst, Dalhousie, and Richmond. Australian Colonies—Sydney, Moreton Bay, Melbourne, Geelong, Portland Bay, Hobart Town, Lannecost, Perth, Fremantle, Adelaide, and Arrickland. Cape of Good Hope—Cape Town, Port Elizabeth, and Simon's Town.

The duty of these officers is to afford gratuitously to emigrants all the facilities in their power by way of advice and information as to the districts where employment can be obtained most readily, and upon the most advantageous terms, and also as to the best modes of reaching such districts.

The Emigration Commissioners, while they have funds for the purpose, grant passages to New South Wales, Victoria, and South Australia, to persons strictly of the labouring class who may be considered eligible emigrants. The funds are restricted to the amount annually voted, and the administration of them the Commissioners act as trustees for the colonies, and are therefore bound to look exclusively to colonial interests. They do not consider therefore how distress in this country may be best relieved, but how the largest possible number of industrious persons may be procured and sent out. In deciding what classes are most suited to the wants of the colonies, the Commissioners are guided by reports and instructions received from time to time from the governments of the respective colonies, either direct or through the Secretary of the Treasury. The Commissioners are occasionally also able to grant passages to Western Australia; but they have no funds for assisting emigrants to go to the North American colonies. In British Guiana, the Governor and Executive Council, in 1857, of 1854, sect. 4, is authorised by proclamation to name the places from which emigration on bounties is permitted, and to fix the rates of bounty for the introduction of emigrants, under the assistance of the colony, competent and willing to engage in agricultural labour.

Emigration is one of the 'modes of relief' contemplated by the Poor Law Amendment Acts (4 & 5 Wm. IV. c. 76; 11 & 12 Vict. c. 110; 12 & 13 Vict. c. 103; and 13 & 14 Vict. c. 110). Emigrants were at first emigrated with the assistance of funds obtained under the Act 4 & 5 Wm. IV. By sect. 62 of that Act owners and rate-payers are empowered to raise money on security of the rates for the purposes of emigration, under the authority of the Poor Law Commissioners. The sum so raised must not exceed half the average yearly rate of the preceding three years, and it must be repaid within five years. The money is advanced to emigrants by way of loan, and is recoverable by the Union to whom the emigrant has been convicted of emigration, refuses to do so after the expiration of the term fixed, and the loan is also recoverable if persons who emigrate shall return to this country. By the 12 & 13 Vict. cap. 108, the guardians of any parish of the Union are authorised to induce any emigrant to emigrate, or the person emigrating, to furnish to the Poor Law Board, who are to issue their order to confirm the resolution. The 13 & 14 Vict. c. 101, s. 4, enables Boards of Guardians, under similar restrictions, to expend money in and about the emigration of orphans or desert children under sixteen having no settlement, or whose settlement is unknown. But it requires that no emigration of any such orphan or deserted child shall take place without the consent of such child given in petty session, and unless a certificate thereof under the hands of two justices shall have been transmitted to the Poor Law Board. Certain conditions have been laid down by the Poor Law Board in all orders sanctioning the emigration of poor persons, of which the most material is, that the party emigrating shall go to some British colony not lying within the tropics, and having no settlement in it. The Poor Law Board are empowered to pay certain specified sums in the conveyance of the emigrant to the port of embarkation, and on the outfit, including bed, bedding, and clothing.

Under the Irish Poor Law Act, money may be raised for enabling poor persons to emigrate to British colonies; but the money so raised must not exceed one shilling in the pound on the net annual value of rateable property. The Bounty System derives its name from the mode in which the proceeds of sales are applied in obtaining immigrants. In this case persons who introduce persons into the colony receive so much per head, according to the terms of agreement. The contractors engage to find persons willing to emigrate, and undertake to land them in the colony in accordance with one of the terms of agreement. The contractors are in each case responsible for the conduct of the immigrants; and if they neglect to perform their agreement, the money received from the Poor Law Board is applied in indemnifying the contractor for any expense or suffering to which the emigrants may be exposed. In each of the Irish colonies money is paid to the contractors for each ship they bring into the port, and for each passenger they transport to the land. The law makes it obligatory upon the contractors to take particular care of the immigrants, and it prohibits land being alienated by her Majesty, or by any one acting under her authority, except by sale, and in the manner directed by the Act.
Down to the year 1831 no regular or uniform system of selling land appears to have been adopted in the British colonies. The old system of分让 conjure, consisting of the all the claims of the settler, could not be 交寄 to the occupation of land under the name of quit-rents, money payments, or the cultivation of the soil; but these was conditions were not effectively enforced, and in fact was generally found impossible to enforce them. Land was profusely granted to individuals in large tracts, and as cultivation was not enforced, and no roads were made through these tracts, they intercepted the course of improvement. Under the old system, lands in the colony of the Cape of Good Hope are described to as appearing to be subject to be made for a period of 20 years, but in practice these grants have been disposed of for less than 46,000L. In Prince Edward's Island the whole of the land was granted in one day to absentee proprietors upon terms which have never been fulfilled. The influence of these proprietors with the British Government rendered such measures being adopted, as were calculated to enforce the settlement of the grants, and consequently the greater part of them remained chiefly in a wild state. (Report of Mr. C. Beller, M.P., to the Earl of Durham, on Public Lands in British North America, 1838.) This Report contains an account of the system of granting lands in each of the provinces of British North America; and in all of them it appears to have been injurious to the public interests.

In Nova Scotia, commissioners were appointed under the royal sign manual to act as a Land and Emigration Board. The sale of the waste lands of the Crown throughout the British colonies was regulated by the commissioners, and they applied the proceeds of such sales towards the removal thither of emigrants from this country, when the land-fund was appropriated to this object. This board was a subordinate department of the Colonial Office. But the disposal of the waste lands is now, by various Acts of the imperial and provincial parliaments, vested in the local governments. The regulations vary considerably in their details, but we give a summary of the conditions and prices of the waste lands in the North American, Australian, and Cape of Good Hope Colonies.

<table>
<thead>
<tr>
<th>Colony</th>
<th>Mode of Sale</th>
<th>Price per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada (West)</td>
<td>Fixed Price</td>
<td>4s. to 50s. currency per acre, 4s. 6d. mineral deposit.</td>
</tr>
<tr>
<td>Canada (East)</td>
<td>Ditto</td>
<td></td>
</tr>
<tr>
<td>Nova Scotia</td>
<td>Ditto</td>
<td></td>
</tr>
<tr>
<td>New Brunswick</td>
<td>Auction and private sales</td>
<td></td>
</tr>
<tr>
<td>Newfoundland</td>
<td>Ditto</td>
<td></td>
</tr>
<tr>
<td>Prince Edward Island</td>
<td>Private contract</td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>By Auction</td>
<td></td>
</tr>
<tr>
<td>New South Wales</td>
<td>County rates not sold at the public sales</td>
<td></td>
</tr>
<tr>
<td>Western Australia</td>
<td>Auctioned on condition</td>
<td></td>
</tr>
<tr>
<td>Tasmania</td>
<td>Suburban and country lands</td>
<td></td>
</tr>
<tr>
<td>New Zealand (Crown lands)</td>
<td>Fixed price</td>
<td></td>
</tr>
<tr>
<td>Cape of Good Hope</td>
<td>No fixed price</td>
<td></td>
</tr>
<tr>
<td>Natal</td>
<td>Ditto</td>
<td></td>
</tr>
</tbody>
</table>

In Canada there are detached Clergy Reserves for sale in most of the townships surveyed prior to 1841. These reserves are now vested in the Colonial Government by the 48 Vic. c. 21 (1850), subject to the rights of the clergy. They are now thrown open for public sale. The land reported by the chief agent for emigration at Quebec to be the most worthy the attention of emigrants, are the townships Peel, Wellington, Maryborough, and Mornington, covering an area of 250,000 acres, in the county of Huron, Ont. The prices of land in these townships (as of all Clergy Reserves), are regulated by the quality of soil and situation, and average from 8s. to 20s. currency per acre, one-tenth of the purchase money being required at the time of sale, and the remainder to be paid in nine annual instalments with interest. One million acres of land were also appropriated for school purposes by the legislature in 1849, and the school lands in the counties of Bruce, Grey, and Huron are now open for sale to amount to 2,000,000 acres, the terms being 10s. per acre, payable in ten equal annual instalments, with interest. The first instalment to be paid on receiv-

In Canada West, the provincial government have recently opened three great lines of road, and laid out for settlement the lands through which they pass: these are the St. Mary's, the Prince Edward Island, and the Barriefield Road. These roads it will eventually be 171 miles in length, and connect the Ottawa River with Lake Huron. 2nd, The Addison Road, which runs north and south, is 60 miles long, and starts from the settlements in the county of Addington until it intersects the Opeongo Road. 3rd, The Hastings Road, which runs nearly parallel to the Addison Road, is 74 miles long, and connects the county of Hastings with the Opeongo and Opeongo Road. In order to facilitate the settlement of the waste lands in Canada, and to repair these roads in repair, the provincial government have authorised free grants of land along these three roads, not to exceed in each case 100 acres, upon the following conditions—that the settler be eighteen years of age. That he take upon himself the cost of a settlement of one person in a state of cultivation at least twelve acres of land in the course of four years,—build a house (at least 20 by 15 feet) and reside on the lot until the conditions of settlement are fulfilled. Families comprising several settlers belonging to lands, preferring to reside on a single lot, will be exempted from the obligation of building and of residence (except upon the lot on which they live) provided that the required clearing of the land be made on each lot. No title is given to the lot until five years after it has been cleared. The performance of these conditions is thus provided for, and the non-performance of them entails the immediate loss of the assigned lot of land, which will be sold or given to another.

The road having been opened by the Government the settlers are required to keep it in repair. The log house required by the Government to be built is of such a description as can be put up in four days by five men. The neighbours generally help to build the log cabin for newly-arri
ing settlers, and when the building is done, the expense of erection is small; the roof can be covered with bark, and the spaces between the logs plastered with clay, and white-washed; it then becomes a neat dwelling, and warm as a stone house.

The roads in Canada West thus opened up for settlement are capable, both as to soil and climate, of producing abundant crops of winter wheat, of excellent quality and full weight, and of every other description of farm produce grown in the best-cultivated districts of that province.

In Australia and New Zealand licences and leases are granted for large tracts of land for pastoral purposes, at very low rents, as to which the holders have certain restricted rights of pre-emption if required for purposes of cultivation; and subject to the right of being taken by the Government if wanted for public purposes.

In all the colonies the rights of the Crown in regard to minerals are preserved; but in most cases leases are granted on payment of a certain rate per annum. In Canada, the mining laws are 10 per month, for each individual licence, payable in advance; or in case of a lease being granted of a certain portion of land, at a rate of three per cent, on the gross value of the gold procured from Crown lands, and of half that amount on gold obtained from private lands. A 'miner's right' to license and dig for gold is obtainable on payment in advance of 17. per annum. 'Stockkeeper's licenses' at the 'Diggings' are given for three months, 97. for six months, 101. for twelve months.

The Land and Emigration Commissioners are required by their official instructions to prepare and issue "a distinct statement of the most recent statistics of agriculture, the commerce, the manufactures, the physical structure, and the ecclesiastical and political institutions of
EMM, a name used by early English writers for the

Endomosis, a name given by Dutrochet to the process by which fluids pass from the exterior to the interior of a cell. This process seems to result from two distinct agencies, which are always brought into operation where fluids pass through a membrane. The one is the imbibition of the fluid by the porous cell-membrane, and the other is the mutual diffusion of miscible fluids. From the researches of Matteucci and others there can be little doubt that the passage of a gas or liquid through an animal or vegetable membrane is but the modification of the process of attraction by which fluids pass through inorganic bodies. This process is carried on with various degrees of force in different materials, and seems to depend on the degree of attraction subsisting between the particles of the solid and those of the fluid. Matteucci found that when glass tubes of about three-quarters of an inch diameter were filled with fine sand previously dried, and introduced without pressure, and were immersed at their lower ends into the following liquids, the action of imbibition raised the liquids in the tubes to the following heights:

| Solution of Carbonate of Potash | 65 millimeters. |
| Solution of Sulphate of Copper | 70 |
| Serum of Blood | 70 |
| Solution of Carbonate of Ammonia | 62 |
| Distilled Water | 60 |
| Solution of Common Salt | 55 |
| Brine | 65 |
| White of Egg, diluted with its own | 35 |
| volume of water |

In these cases the imbibition took place at first rapidly, then more slowly, and ceased entirely at the end of ten hours. When thick solutions of gum, or starch, or fixed oils were employed, scarcely any imbibition took place, and it was but seldom that even saline solutions approached this degree in which different fluids pass into different solids will be seen in the following table:

<table>
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<tr>
<td>Alcohol</td>
<td>56 mill.</td>
<td>175 mill.</td>
</tr>
<tr>
<td>Water</td>
<td>175</td>
<td>183</td>
</tr>
</tbody>
</table>

Thus showing that water passed more freely than alcohol into sand, but less freely into saw-dust, and both fluids passed with equal facility into pounded glass. The size of the tubes employed in these experiments and the temperature of the room are not stated. The rise is considerably higher in proportion as the temperature increased. This enables us to understand the influence of heat on life by the physical effects it produces.

Not only is the passage of fluids from the exterior to the interior of a cell facilitated by the attraction between the cell-wall and the fluids, but the fluids on either side of the membrane have a tendency to mix with each other, which cannot but assist in this process. Professors have at times been disposed to think that the latter gives an inherent tendency to mix with each other, independent of the laws of gravity, but that this law also applies to the miscibility of liquids. In a Memoir on this subject in the 'Philosophical Transactions' for 1860, he has shown the laws which regulate the passage of fluids through paper. Different substances possess this property in different degrees. Thus, when solutions of the following substances were used, of the strength of 20 parts to 100 parts of water, the relative quantities diffused in a given time were as follows:

| Chloride of Sodium | 58 |
| Sulphate of Magnesia | 37-43 |
| Nitre of Soda | 51-56 |
| Sulphate of Water | 60-32 |
| Copper | 57-74 |
| Starch-Sugar (Glucoce) | 36-94 |
| Gum Arabic | 13-34 |

The experiments from which these results were obtained, were performed by inverting a phial containing the solution to be diffused in a large jar of pure water. The diffusion was stopped after seven or eight days, and the amount of diffusion determined by evaporating the water of the jar to dryness. There can be little doubt that the substances which diffuse from the juices of plants and animals must have an important influence on the changes which go on in the cells during the performance of the functions of the vegetable or animal body. "Thus," observes Dr. Carpenter, "the low diffusibility of albumen obviously tends to the retention of the serous fluids in the tissues; whilst the high diffusibility of urea will favour its escape from them." The following is an account of the process of Endomosis, and some of the conclusions at which we may arrive from Dr. Carpenter, and直通车 into the following curve a

"If into a tube, closed at one end with a piece of bladder or other membrane, be put a solution of gum or sugar, and the closed end be immersed in water, a passage of fluid will take place from the exterior to the interior of the tube, through the membrane, and the solution of the combined salt will be entirely taken up, and the combined solution will be greatly increased, its strength being proportionally diminished. At the same time, there will be a counter-current in the opposite direction; a portion of the gummy or saccharine solution passing through the membrane to mingle with the water; and the process will be repeated. The first current is termed Endomosis, and the counter-current Exosmose. The increase on either side will be due to the relative velocity of the currents; and the changes will be in proportion to the difference of the tubes used; and so nearly alike as to be incapable of maintaining it. The greater the original difference (provided that the denser be not actually viscid, but be capable of mixing with the other), the more rapidly and powerfully will the process be performed. The best means of experiment is upon the phenomenon afforded by a tube, narrow above, but widely dilated below, so as to afford a large surface to the membrane, compared with that of the superincumbent column, which will then increase in height with great rapidity. By bending this tube in the form of a syphon, and introducing into it a curve and a quantity of mercury, the force as well as the rapidity of the Endomosis between different fluids may be estimated with precision. In this way it was ascertained by Dutrochet, in some of his experiments, that the fluid might be raised against a pressure of no less than 44 atmospheres, or nearly 70 lbs. to the square inch. Although it is not universally true that the activity of the process depends upon the difference in density of the two fluids (for in one or two cases the stronger current passes from the lighter to the heavier), yet it is necessary with regard to particular solutions, as those of gummy or saccharine matter. No endomosis takes place between fluids which will not mingle, such as oil and water; and very little between such as act chemically on each other. Although an organic membrane forms the best septum, yet it has been found that thin laminæ of baked pipe-clay will suffice for the evident production of the phenomenon; and that porous limestones possess the same property in an inferior degree. Although it is not possible to explain the phenomena of Endomosis upon physical principles, yet these will go so far towards it that the general conditions of the process may be considered as well understood. Supposing that two mutually diffusible liquids are on the opposite sides of a porous septum, which is not equally permeable to them; then which is the most readily imbibed will tend to occupy the capillary passages of the septum, and will thus be brought into contact with the liquid on the opposite side. This contact will prevent the fluid from passing into the pores of the septum; and as fast as that which occupies these pores is removed by diffusion, so fast will it be renewed on the other side,—just as oil continues to ascend through the capillary channels in the wick of a lamp, so long as it is being supplied from above. In this way, then, an endomotic current is produced, the force of which will depend upon the diffusion-powers of the two liquids, and upon the difference of the attractive power which the capillary tubes of the septum have for the two respectively.
Thus when a solution of sugar or gum is on one side of the septum, and water on the other, the water is the most readily imbibed, and consequently the chief mixture and diffusion will take place on that side at the surface of the septum in contact with the more viscous liquid. But at the same time this liquid is tending to diffuse itself through the water which occupies the capillary channels of the septum. This is not merely attributable to the difference of density, for the endosmotic current is only attracted by it in a less degree than the water, a portion of it finds its way in a direction opposed to the principal current, and diffuses itself through the water on the other side, thus constituting Exosmose. Thus it happens that the diffusion of the liquids takes place in one of two ways, determined by the attractive power of the septum for one or the other of the liquids; though the diffusion-power of the liquids through each other will help to determine its force. When alcohol and water, for example, are separated by a septum, the alcohol is imbibed from the water towards the alcohol, because the former liquid is more readily 'wets' the membrane, and consequently tends most strongly to occupy its capillary passages; but on the other hand, when the separation is made by a thin lamina of cotton-wool, the endosmotic current is from the alcohol towards the water, because the former is most readily imbied by the septum.

It has further been ascertained by the experiments of Matteucci, that when an organic membrane is employed as the septum, the amount of transport is greatly affected by the direction in which the endosmotic current traverses the membrane. Thus, when the skin of the Torpedo was employed, with a solution of sugar on one side of it and water on the other, although there was always an endosmotic current from the water to the sugar, the current was strong enough to raise the interior liquid to 80° when the water was in contact with the internal surface of the membrane, in the same time that was occupied by its rise to 20° when the external surface of the membrane was turned towards the water. Again, when the mucous membrane of the stomach of a dog was used as the septum, and its external (or muscular) surface was placed in contact with alcohol, the passage of water from the other side took place with such rapidity that the water was raised to 100°, while in the case of a similar but internal (or mucous) surface of the membrane were placed in contact with the alcohol and the mucous surface with water, the current was only sufficient to raise the liquid 6 degrees in the same time; so that it is evident that the transudation of water takes place much more readily from the mucous lining of the stomach towards the outer side of the viscus than in an opposite direction, in virtue simply of the physical properties of the membrane. In fact, according to the experiments of Matteucci, no current is in the cases of fresh membranes, Exosmose takes place with equal readiness, whichever of the two sides is exposed to the water.

The direction which is most favourable to Endosmose through skins is usually from the internal to the external surface, with the exception of the skin of the frog, in which the endosmotic current, in the single case of water and alcohol, takes place most readily from the external to the internal surface. But when stomachs and urinary bladders are employed, the direction varies much more, according to the nature of the liquids employed. This variation appears to have some relation to the physiological conditions in which these membranes are placed in the living animal: thus, the direction most favourable to Endosmose between water and a saccharine solution, is not the same for the stomach of a ruminant as for that of a carnivorous animal; as yet however no positive statement can be made on this subject, however curious and important it may be. The same hold good of the direction of the diffusion-power that have been dried or altered by putrefaction, we either do not observe the usual difference arising from the position of the surfaces, or Endosmose no longer takes place; thus affording another indication that it is to the physical condition of the perfectly undisturbed membrane that we are to look for most of the peculiarities which are noticeable in the transudation of fluids through them. The exosmotic current does not bear any constant relation to the endosmotic, as may be expected from the preceding statement; for if the liquids have different exosmotic and endosmotic powers, and the difference in attractive power which the septum has for them respectively is not great, each may find its way towards the other, and a considerable exosmose may ensue, with very little change of level. The amount of the exosmotic as of the endosmotic current, varies with the direction in which it traverses the membrane; thus, when sugar, alcohol, or gum, was employed in solution, its transudation towards water took place more rapidly than the exosmotic did away from water. If all the skins experi-enced on the principle of imitation of liquids into the tissues and canals of the living body, we shall have to inquire how far they are capable of being accounted for on physical principles which have been now brought forward. It has been maintained by some that absorptive processes in the living body do not occur during the lifetime of the animal, and it has been supposed that all the fluids in the body were stagnant, and another in which an active circulation is taking place. Thus, as Matteucci has shown, if the hind legs of a frog recently killed be immersed for some hours in a solution of furnes potassium, or of a large vein of an animal, be fixed by one extremity to an opening at the bottom of a vessel filled with water, and have a stop-cock attached at the other extremity, and be then immersed in water acidulated with sulphuric or hydrochloric acid, when the tube is allowed to rest in the mixture, the fluid will tend to diffuse itself through the canals or vessels, and to the interior of the tube, which is distended with water; but if the stop-cock be opened, and the water be allowed to discharge itself, the presence of the acid will be immediately discovered (by tincture of litmus) in the liquid which flows out, showing that the acid has been assisted in its penetration of the walls of the tube by the current traversing its interior. Thus, the continuance of circulation is essentially one of the most patent of all the conditions of absorption in the living body; and it is a strong argument, that the dead and living organisms, placed under the same circumstances, may be accounted for in great part, if not entirely, by the stoppage of the circulation in the former. All the circumstances which are laid down by physiology as the conditions are in great measure identical with the physical principles which have been now explained. These circumstances are—1. The readiness with which the liquids are to be absorbed with the juices of the body. 2. The permeability of the tissues through which the absorption takes place. 3. The absence of previous distention in the tissues or canals towards which the flow takes place. 4. The elevation of the temperature within certain limits. 5. The vascularity of the tissues, and the rate of movement of the blood through the vessels. And the results of experiments upon recently-dead membranes which retain almost exactly the same physical conditions as those which they possessed during life, but have entirely lost their vital properties, seem most decidedly to indicate that the action of the exosmotic process is still observable, and the direction most favourable to their passage through the tissues, are determined in great part by the physical relations of those tissues (and of the vessels which traverse them) to the liquid which is seeking entrance thereto. In this then, many of the phenomena of selective absorption are probably to be explained, especially in plants and the lower animals. The special absorbent vessels, however, of Pterisbracteae seem to possess properties which can scarcely be accounted for. ('Principles of Physiology.' [Assomption.])

ENDYMION, a genus of plants belonging to the class of Endogena, the order Dilleniaceae, and the tribe Hemerocollidaceae. It has a tubular bell-shaped perianth, composed of four or five persistent leaves, with reflexed points combined below.
the observations that have been made up to the present time, it appears that these plants are truly in their natural positions in the localities in which they are found, and that they only multiply or become sources of disease when the bodies on which they grow get into a disordered state. In the same manner the patients who seem constantly present in the air and water, only awaiting the proper combination of circumstances to be developed in prodigious numbers. The circumstances which predispose to the growth of these Entophytes upon the body, are not better known than those which predispose the body to receive certain contagions. A failure of the ordinary vital powers to carry on the healthy processes of life seems ordinarily to be the inviting cause of such a development of these plants as would constitute a disease.

All the observations that have been made on this important subject have been brought together by M. Robin in his work on the 'Natural History of the Parasitic Vegetables which grow on Man and on Living Animals' (Paris, 1853). The following is a classification of these plants:—

I. A Dixon.

Class Icocarpea.
Sub-Class 1. Distomaceae.
Sub-Class II. Malacoceae.

Genus P4.0pernias, 11 species.

Genus Molosporas, species.

Genus Tnolphas, species.

Genus Leptotrichia, species.

Genus Chlorophyton, species.

Genus Leptomias, species.

Genus M.oudia, species.

Genus Laprophyta, species.

Genus Saprolegnias, species.

Genus Enterobryum, species.

Genus Eosinum, species.

Genus Nicotiana, species.

Order II. Cryptogaealogae.

Family Oscillatoria.

Genus Oscillatoria.

Genus Zygnema crassitudum.

Order II. Coniopteridium.

Family Chlorella.

Genus Chlorella watermoria.

II. Fenio.

Division I. Arthroporae.

Tribe Tonsilaci.

Genus Trichophyton, species.

Genus Microsporium, species.

Genus Speronema musca.

Tribe Oldieii.

Genus Achorion Schneidinii.

Genus Oidium, species.

Tribe Aspergieii.

Genus Aspergillus, species.

Division II. Trichoracii.

Tribe Cryptocacii.

Genus Dactylichum oogenum.

Genus Botryis Basiania.

Tribe Sporotrichi.

Genus Sporotrichium.

Tribe Isaria.

Genus Isaria, species.

Division III. Cytoporae.

Tribe Cytoporae.

Genus Musco Musco.

Division IV. Chiroporae.

Tribe Conioptidea.

Section Paragrandes.

Genus P. Assisi fava.

Sub-Division Endoliveii.

Section Sphorhama.

Genus Lobostoma, species.
I. Man and the Mammalia.

A. The Skin.

Trichophyton tonsurans. Malston. (On Hairs.)
T. sporuloids. Ch. Robin.
T. ulcerans. Ch. Robin. (On Ulcerated Skin.)
Microsporum Audouini. Gruby. (Hair Follicles.)
M. matogastieus. Ch. Robin. (Roots of the Hair.)
M. furfur. Ch. Robin. (Skin.)
Mucor mucado. Linnaeus.

Achomorh Schamellein. Remak. (The Hair and the Hair Follicles.)

Aaspergillus species. Facini and Meyer. (Auditory Passage.)

Puccinia farif. Ardsten.

B. On the Mucous Membrane.

Cryptococcus sereus. Kützing. (Intestines.)
C. guttulatus. Ch. Robin. (Rabbits.)
Merismopedia ventriculi. Ch. Robin.
Leptochirax lusca. Ch. Robin.
Oncidium (i) of the Intestines. Ferrer.
Leptomitus urochloris. Mont. (Bladder.)
Leptomitus of Hannover. Ch. Robin. (Pharynx and Oesophagus.)

Leptomitus of the Spidermilia.
Leptomitus of the Uerons.

Leptomitus of Uterine Mucous.
Leptomitus of the Eyes.

Oidium ulicicnus. Ch. Robin. (In Thrush.)

Eggs. of the Lungs. Bennett.

Eggs. of the Nasal Mucous.

II. Birds.

A. Of the Respiratory Organs.

Aaspergillus candidus. Michele. (The Air-Cells and the Lungs.)
A. alabaster. Fries.

A. nigrescns. Ch. Robin.
A. strix nyctea. J. Müller and Retzius.
Moldiness of the Lungs of the Jackdaw. Meyer.

B. The Eggs.

Oxychlamys ogenus. Montague.
Sporotrichum (Nematogonum) brunneum. Schenk.

III. Reptiles.

A. The Eggs.

IV. Batrachians.


V. Fishes.

A. The Skin.

Zygmena cruciatus. Agardh.
Chesnotera (Tremella) meteorica. Ehrenberg.
Saprolegnia ferax. Kützing.

Converse of Gold-Fish. Bennett.

Algae of the Stickleback. Manicus.

A. The Gills and the Cellular Tissues.

Pentacapsulata of the Fish. J. Müller.
P. of the Symodon Schal. J. Müller.
P. of the Sandre. (Luciperca sandra.) J. Müller.

P. of the Bocah. (Cyprinus rutilus.) J. Müller.
P. of the Lobo nitidus. J. Müller.
P. of the Pimodous Blochii. J. Müller.
P. of the Pimodous Sebe, and of Platysoma fasciata. J. Müller.

P. of the Cutamone atalis. J. Müller.
P. of the Odogus elatissus. J. Müller.
P. of the Aerina vulgaris of Grenville. Creplin.

P. of the Scena umbra. Ch. Robin.


VI. Insects.

A. On the Elytra, and on the Articulariae.


G. vivaria. Ch. Robin.

Silbum lupus. J. Müller and Ch. Robin.

B. On the Caterpillars and Chrysalis in the Tissues.


Genus Spharia. Haller.

Section Cordyceps. Fries.
Spharia militaria. Ehrenberg.
S. sphaerocephala. Klein.
S. entomorhiza. Dickson.
S. echteris. Hill.
S. hoberi. Hooker.

Kerdospernum microphalasum. Wallroth.

K. micranthum. Wallroth.

Tsarica deuteruromerus. Nee.

J. acoos. Fries.
J. atrypopsis. Fries.

J. arachniopila. Dittmar.
J. leprosa. Fries.
J. Turtaria. Wallroth.

I. ceraspe. Pernoon.

S. phaeoptila. Dittmar.

J. xenops. Fries.

I. aranearum. Schweltz.

I. mykynum. Schweltz.

I. gigantes. Montague.

C. In the Intestines.

Molluscs of the common. Ch. Robin.
M. octonia. Ch. Robin.
M. gyrin. Ch. Robin.

Leptochirax inclusorum. Ch. Robin.

Genus Sorex. Leidy.

E. longa. Leidy.

E. moniliformis.

Cistolophyrus somatidis. Leidy.

Antheromitus cristatus. Leidy.

A. nitida. Leidy.

VII. The Myriapoda.

A. In the Intestines.

Enterobrya elegans. Leidy.
E. spiralis. Leidy.
E. attenuata. Leidy.

J. ocellata. Ch. Robin.

VIII. The Mollusca.

A. On the Vesicle of Sugs. (Algus indeterminata. Lebert.)


The most interesting of these species are undoubtedly those which attack man or the animals which he domesticates and employs. With the exception of the Botrisa of the silk-worm, the latter have not been much investigated. Those which attack man, and accompany diseased conditions of his body, are better known. They may be divided into those which are found on the skin, and those which are attached to or found in the secretions of the mucous membrane.

1. Entomoptera of the Skin.—Ten species have been noted in this locality. We shall enumerate them in the order in which they are given by M. Robin.

1. Trichophyton tonsurans (Malston); Trichomycetes tonsurans; Myxomera of the Picea Polonica; fungus of the hairs in Herpas tonsurans; fungus of Porrigo sevararia; Achorion Lebertii; fungus of the Teigna tonsurans, Bain; Batropylax, Gruby. This fungus was discovered and described in 1844 by Gruby in the disease called by the brothers Muller. Teigna tonsurans; by Cazeneve Herpes tonsurans; by Erasmus Wilson Trichomes furfuracea (one of the diseases called Ringworm and Porrigo eccutula in this country). It exists also, as pointed out by Gunsberg, in the Picea Polonica, although the two plants were formerly described as different. The Trichop Consultant is formed by oval transparent spores, which give rise to articulated filaments. Its anatomical seat is in the interior of the roots of the hairs. The hairs and fungi simultaneously increase. The format seem larger than usual, are paler in colour, lose their clas-
tightly, soften, and break off when they have risen some one or two lines above the surface of the scalp. In the short course then left the fungus grows still more rapidly, so that the trunk leaves the hair, and sometimes becomes indistinguishable. Sometimes the hair breaks off before emerging from the skin, and the fungus, epidermis, and sebaceous matter, fill the ends of the piliferous conduits, and the hair becomes a naked eye in this disease, and give the skin a rough appearance.

The sporules and mycelium of the plants can sometimes be seen, in the form of a white powder, on the roots of the broken hairs. Sometimes the cutis becomes congested and red, and so thickened with scales of epidermis, with fatty and albuminous granules, with pus, &c., and crusts are formed of greater or less thickness in which the growth of the fungus can go on. Messrs. Robin and Bazin adopt unreservedly the opinion that the Trichophytia is the cause of the disease. It makes the diagnosis of the disease; in the trichophytia of the several species. Each has been named and given, and each has given examples of the con
tention of the disease by the transmission of the spores. Bazin has made the very important observation that the same disease will attack horses, and can be communicated from them to men. Both Robin and Bazin however admit that there is some condition of the hairs (dependent no doubt on constitutional causes) which is essential for the growth of the plant, as sometimes the disease disappears, the hair is dark, hard, and thick, and the affection is not to be seen except in the case of one of the commonest fungus which is the true, and in many cases there are no vesicles at all throughout the whole course of the disease. The term used in this country for Puccinia scutulata is inadvisable as it is applied with greater justice to Favus. The old term of Tinea is given by another, and the specific active tinea expresses well the feature of the disease, the baldness arising from the brittleness of the hairs.

2. Trichophytia (? sporusculata) (Rubin), (Myoderm of the Plica Folliculus). In addition to the former species, Walleriana has been described. The circumscribed flattened spores, which have been too little studied to be stated to present their exact characters to be stated.

3. Trichophytia (? ucercum) (Rubin). Lebert has described a fungus in the crusts covering an aciculous nodule of the bear.

4. Microsporon Audouini (Gruby). This mycelium has been studied by Gruby, and its existence, though denied by Cazenave, has been confirmed by Robin. It is present in the disease commonly called after Willan Puccinia desiccativa or Puccinia scutulata. It differs from the Trichophytia of Tinea tondens, by its numerous waved filaments, and by the extremely small size of its sporules. It is not found, like the Trichophytia, in the interior of the root, but forms round each hair a little tuft of the same, somewhat similar to that of the Alsect. The Aleocia is rapid, with or without vitiligo of the skin. The dermis is not congested, and the epidermis is thin and smooth. There is an affection which should probably be distinguished from the Puccinia desiccativa, or Alsect. coronscripta, and which is characterised by a rapid disappearance of pigment from both skin and hair, with or without Aleocia. M. Bazin includes it in his Tinea achromatosa, but does not mention the fact that Aleocia is not constant. He states that a parietal plant is present, but does not describe it. There must however be something more than a fungus to cause the total disappearance of pigment from a considerable portion of the dermis. Besides, when the hairs return they sometimes appear only greyish or thin colored, and if the vitiligo were on the root of the plant, it is pro
bable they would not grow at all. The disease appears to be allied to those obscure pigmentary changes which have a much deeper seat than the surface of the body.

5. Microsporon furfur (Rubin). In 1846 Eichstett discovered a cryptogamic plant in the disease called by Willan Puccinia varicale, and more lately Alopecia. Soon after-
Tinea faciosa can be communicated by transfer of the plant, and that the disease can be cured with the greatest readiness by the application of a preparation of the bark of a plant more or less destructive to vegetable life. That a special nidus is necessary may very well be admitted by the partisans of this view, since even in the case of epidemic agents a predisposition is necessary; yet no one dreams of confounding the co-operating cause with the special and peculiar poison.

It may be desirable to recapitulate the diseases of the skin in which parasitic plants are found:—

1. Tinea tondu in which the Triphophyton tondu is present.
2. Tinea faciosa, in which are present the Acchorion Schencklinii, and the Pustecini Favei in some cases.
3. Mentagra, or Tinea mentagia, which exhibits the Microsporon metagraphi.
4. Neuitis fulvus (Chloasma), in which the Microsporon furfur occurs.
5. Perrigo decalvans (Tinea achronatmos), in which the Microsporon Audouni is found.
6. Pilo Polonem, in which the Triphophyton tondu and Triphophyton sporidoriae are present.

11. Entophyta on the Mucons Membrane.—The plants forming on mucous membranes, or in the contents of cavities lined by mucous membrane, are of less interest than those which occur on the skin, as in most cases they are decidedly only secondary. We shall merely enumerate them:—

1. Cryptococcus Cerviica, Knitting (Torula Cerviica), the Yeast-Plant in the bladder, stomach, intestines, &c.
2. Merismopodia senescens, Robin (Cervinae), in the stomach of the horse and other animals.
3. Leptokaria buccalis, Robin (Alga), of the month.
4. Octularia of the intestines. (F. Par.)
5. Leptosynera urispinus, Robin; an Alga described as forming in the nines. It has as yet been scarcely studied.
6. Leptosynera (T.), Hanover, Robin; Alga found by Hanover in the pharynx and esophagus.
7. Leptosynera of the uterus.
8. Leptosynera of the uterine mucus. (E. Han.)
9. K. M. (F.)
10. Oidium albicans, Robin (Cryptogenic) of diptheritis and aspas; Aptophyte. (Gruby.)
11. Fungus of the lungs. (Bennett.)
12. Fungus in the discharge of glands.

To this list from M. Robin may be added the so-called Cholera Fungus of Brittan and Budd. It should however be added that no confirmation of the view originally taken by the discoverers, that the fungus discovered in the dejections of man with cholera, is the cause of the disease, has been afforded. The only explanation that can be given of the occasional occurrence of the spores of fungi or spore-like bodies on the mucous membrane of the stomach and intestines, is their introduction with the food. It has been shown that spores of certain fungi are found naturally on grains of wheat, and only await favorable conditions for development. Such fungi may be constantly introduced into the stomach with the floor of wheat in the form of bread or other kinds of food.

Is the study of the vegetable parasites of animals, particularly those of the intestinal canals, it is necessary to be careful not to confound the tissens of certain well-known cryptogamie plants, which may serve as food or adhere to the ordinary food of such animals, with true Entophyta. Thus fragments of fungi, convery, lichens, and the spores of these, need as food, or adhering as foreign matter to food of an ordinary kind, are liable within the intestine to be mistaken for the vegetable parasites of animals.

In mid-winter I found beneath an old fence- rail an individual of Aschera nigra, or large black cricket, within the provisions of which were large quantities of what I supposed at the time to be a free floating Entophyta, resembling in general appearance the ordinary Yeast Fungus or Torula, but which I now suspect to be an ergot upon which the animal had fed. The plant consisted of oblong or oval vesicular bodies, apparently thickened at the poles, and filled with a white material, but this appearance more probably arose from the cells being condensed together in a single large, transparent, colorless, amorphous globule, which pressed a small existing amount of protoplasm to each end of the cavity. The cells were single, or in rows, to eighteen in number, and in some single cell of comparatively large size had an attached pair of cells, or rows of cells at one or both ends. Occasionally they are met with containing one or two small round hyaline amorphous nuclei. The isolated cells, measured from the 20th to the 40th of an inch in length, are about 30,000 to the inch, and the rows measured up to the 60th of an inch in length. (Leidy.)


ENTRE RIOS, one of the Riverin provinces of the Argentine Confederation, South America, owes its name to its situation, which is at the mouth of a river named Parana. Its boundary comprehends however only the southern part of the peninsula formed by those rivers, the northern portion forming the province of Corrientes. The boundary between the provinces is formed by the Rio Guaycuruque, which falls into the Parana near the town of Mocoreta, which lies between 30° 30' S. lat. The area is about 23,000 square miles. The population is about 25,000.

This surface is gently undulating; it is broken by hills along the middle portion or interior of the country. The part is covered with forests of low stunted trees. The southern part of the province is low, and especially along the banks of the Parana subject to inundations. The northern part is occupied by a low swampy tract, known as the Forest of the Immortelles, a term which was given to it by Audouin. The province is abundantly watered by numerous small streams. The soil of Entre Rios is in general fertile, and covered with luxuriant herbage. The climate is mild and dry. Frost never occurs, the lowest temperature seldom falls more than fifty days in the year. The highest range of the thermometer during the year 1844-47 was 96° in January 1844; the lowest, 50°, occurred in the month of June in 1844 and 1846. (M'Cann.) Cultivation is limited to a comparatively few spots. The principal grain crops are wheat, barley, and maize. Tobacco and cotton of excellent quality are also raised, but the crops are precarions in consequence of frequent droughts. Great damage is also done to all kinds of crops by the immense swarms of locusts and ants, which sometimes descend like a rain upon the country.

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In 1844 so great a drought occurred that the grass was everywhere burnt up; and Mr. M'Cann states that the whole of the cattle in the province went off from the feeding grounds during the drought. The cattle has, however, since then been increased from 40,000 to 50,000, and now numbers 150,000. Horses are bred in great numbers. Owing to the long-continued state of anarchy in the province there are, in the unsettled parts, numerous herds of wild cattle and horses. The people are generally small; many of them are Indians or mestizos of mixed blood.

Mechanical employments are almost entirely neglected. The geographical position of the province admirably adapts it for commercial pursuits; but owing to the many of the country, living with Corrientes in the same large, disturbed state in which the country has so long been kept comparatively little commercial progress has yet been made. Now however that the rivers are declared open to vessels of all nations, under the guarantee of the principal maritime powers, there seems to be required only internal peace for the development of the great capabilities of the country. The exports are principally of hides, corns, tallow, and jerked beef.

Like the other provinces of the Argentine Confederation, Entre Rios is a feudal state, owning but little dependence upon the central government. The government is almost entirely in the hands of a governor, elected for the term of two years. The Congress consists of deputies chosen from the several towns or districts. The revenue is derived chiefly from customs duties.

Except a few families of Guarani origin, the country is almost entirely inhabited by the descendants of Spaniards. In the towns however a few foreigners are settled, mostly Italians, and a very few of Scotch and of some French and English traders. Some of the large estancias (cattle farms) and saladeros (tallow-melting establishments) are the property of and conducted by Englishmen.

Entre Rios took a leading part in the revolt against the soldiery of the Ayres, joining with Corrientes in the engagements with foreign powers, which led to the fall of Rosas, and in
**Concepción de la China,** formerly called Uruguay city, on the Uruguay, is a small but old town of about 1500 inhabitants. It once carried on some trade with Montevideo, but it is now decayed and ruinous. The houses are mostly built of wood and mud, with thatched roofs. In the centre of the Plaza is a pyramid now falling to pieces. In the vicinity is a large saladero. **Concordia,** on the Uruguay, opposite Salta, from a village of a few mud huts, appears to be growing into a town of about 1000 inhabitants, and carries on a good deal of trade. But the situation is bad, as vessels are unable to reach the town at low water, and are obliged to anchor about two miles below it. It contains a church and a large school-house, endowed by the government, on the model of those in the same name (31° 10' S. lat.), is a town of between 2000 and 3000 inhabitants, of whom nearly 300 are foreigners, chiefly Basques and Italians. It is a place of a good deal of trade, but vessels cannot approach nearer than about three leagues from the town. In the neighbourhood is the most extensive estancia in this part of the country, belonging to an English subject. It is the property of Mrs. Britannia of Sheffield, and occupies 500 productive leagues of land. Several other estancias belong to the British, and which are worked by negroes, near the month of the Gualeguay-chu, about 60 miles E.N.E. from Gualeguay, population about 2500, including nearly 300 foreigners, contains a neat church and a good school-house, and is a place of some trade; but the situation is inconvenient, as vessels drawing more than 6 feet of water are sometimes obliged to wait two or three weeks to get across the bar at the mouth of the river. In the neighbourhood are some large tallow-melting establishments.

**Epera,** a genus of Plants belonging to the natural order **Paceae.** It has four thick and concave sepalae connected together into a permanent urceolate tubule at the base, with the segments inserted at the side. The flower is a perfect one petal, which is roundish, fringed, and inserted in the middle of the calyx. There are 10 stamens, which are long thickened filaments, rather villous at the base, and joined into a short monadelphous ring. The ovary is stipeate. The style long and filiform. The legume compressed, dry, coriaceous, falciform, 2-valved, 1- to 4-seeded. When young it is tomentose. **E. falcatia** is a tree with abruptly pinnate leaves, bearing 2 or 3 pairs of ovate acuminate leaflets on peduncled, constantly composed of numerous distant racemes. It is the Wallaba-Tree of Guyana according to Sir Robert Schomburgk, who informs us that its wood is deep red, frequently variegated with whitish streaks, hard, heavy, and shining, and impregnated with an oily resin which renders it very durable. It is bark is thicker, and is used by the Arawak Indians as an emetic.

**Equisitite.** [Mineralogy, 21]

**Equidae.** [Mammalogy, 6]

**EQUITY.** The proceedings of the Court of Equity have been greatly simplified and cheapened by several recent statutes. The nature and objects of the jurisdictions of the Commissioners appointed to examine this subject in 1850. Instead of the writ of **suppensa**, which merely gave the defendant notice of a bill having been filed but afforded him no information of its contents, the bill itself, in a convenient printed form, is now served upon the defendant, either personally, or by being left at his house; or under special circumstances with some other person (as for instance, the solicitor or agent of the defendant) as his substitute.

In the case of an attachment against an unprivileged person, by having an attachment issued against him; against a privileged person, as a peer, or member of parliament, by a sequestration of his property; against a corporation, by a distrain and sequestration if necessary. In the latter, on the giving of a bond, the Court need only on the prosecution by way of attachment and sequestration, he may enter an appearance for a defendant not appearing within eight days after the service, and thenceupon proceed to judgment, and execution.

Until the recent alterations, every bill in chancery contained what is called the **interrogating part** in which every statement and charge in the bill was converted into a series of questions, framed on the principle that the defendant might possibly be a dishonest defendant, disposed to answer evasively, and therefore suggesting modifications of the statement or charge. For example, if the statement were of a deed bearing a certain date, and made between and executed by certain parties in certain words, or to a certain effect, the questions would be, whether such a deed of that date, or of some other and what date, was not made between and executed by such parties, or some and which of them, or some other and what parties, in such words, or to such effect, or in some other and what words. Originally these interrogatories were used much more sparingly, and they were confined to those matters supposed to be within the knowledge of the defendant, as to which it was considered necessary or desirable to extract admissions from him. But in many of the actions with which the old practice was still lived the process was adopted of transmuting all the statements into questions of the nature above described. The length of the proceedings and the expense to all parties concerned were thereby greatly increased. There is now no interrogating part in any suit, and where a defendant, whether from any defendant or to a bill, he may file interrogatories for their examination.

The demurrer, plea, or answer of the defendant to the bill, each remaining as before, is no longer taken with the expensive formalities which used to accompany it. Formerly a *decimus potestas* or commission was issued to take the answer and oath of a defendant in the country, which was scaled up, and either brought by one of the commissioners to the county, or sealed the defendant, who swore he received it from one of the commissioners, and that the same had not been opened or altered since he received it. The answer is now however filed without further formality than in swearing to affidavits, and unless sworn before any justice of the peace, a public, or vice-council, lawfully authorised to administer oaths, the messenger's oath being dispensed with.

In many cases, indeed, when the facts in dispute between the parties are not of a complicated character, the answer is now not requisite. Affidavits may be filed by the plaintiff and defendant, upon which the court will determine the case, unless it be thought proper, in addition thereto, to examine or cross-examine the parties orally.

The practice which formerly prevailed of examining witnesses on interrogatories, having been found in many respects very inefficient and objectionable, has also been abolished; the court retaining the power to order particular witnesses to be examined on oaths or by affirmation. The exceptions allowed are as before.

When therefore a suit commenced by bill is at issue, the plaintiff may give the defendant notice of the mode in which he desires the evidence to be adduced, namely, orally or upon oaths; and if either party give no such notice, or if giving such notice, he expresses his desire that the evidence be adduced upon affidavit, then both plaintiff and defendant may verify their respective cases by affidavit, unless the defendant gives notice to the plaintiff that he desires the evidence to be adduced orally. If no such notice be taken, the witnesses are examined by or before one of the regular examiners of the court, or an examiner specially appointed if necessary. The principal defect in the old mode of examining witnesses was, that the examination being oral, and in many cases conducted by the parties being conducted in the same manner, the party cross-examining laboured under the disadvantage of not knowing what the witness had deposed to his examination in chief; under the modern system, the oral examination of witnesses takes place in the presence of the parties, their counsel, solicitors, or agents;
and the witnesses are then and there subject to cross-examination and re-examination. Every deposition is taken down in writing by the examiner in the form of a narrative, and read over to the witness, and signed by him, in the presence of the parties. When concluded, the examiner transmitted the depositions to the Court, and the cause is then ripe for the hearing.

Another important change in equity procedure relates to the determination of questions of fact, as distinguished from equity. Formerly, if a question of fact arose in the course of the practice of the Court to refer it to the opinion of the judges of the Courts of Common Law, upon a case stated for that purpose; who certified their opinion to the chancellor, upon which certificate the decree would be made. Now the judges have determined and are to settle any questions of law which require to be decided previously to the decision of the equitable question at issue between the parties; for which purpose any of the courts may obtain the assistance of the judges of the Courts of Common Law.

A shorter and simpler method of proceeding than that by Bill and Answer was introduced in the year 1850, namely, that of Claims. This plan was only intended to be used in certain definite cases of comparative simplicity; and subsequent legislative enactments have so much improved the mode of proceeding by Bill, that the advantage of having recourse to a Claims is not now so great as when that procedure was first introduced, and in many cases a Bill according to the new system is found to be preferable. Claims are indeed nisi prius pleadings in the old sense, with the merits of which are to be decided upon affidavits on each side; every order made on the hearing of which has the same effect, and may be enforced as a decree in a suit commenced by Bill. Orders made on claims may also be discharged, varied, or altered, as in the case of the Writ of Habeas Corpus in Chancery, or of the Rolls, or any of the Vice-Chancellors, may be discharged or varied by the Lord Chancellor or the Court of Appeal in Chancery.

A still more summary method of proceeding has been introduced, by the statute 15 & 16 Vict. c. 86, applicable to similar cases of administration. Any person claiming to be a creditor, legatee, or next of kin of a deceased person, may obtain a summons from the Master of the Rolls or any of the Vice-Chancellors, requiring the executor or administrator of the deceased person to attend and show cause why an order for the administration of the estate of the deceased should not be granted.

Upon proof of the due service of such summons, or on the appearance of such executor or administrator, and upon proof by affidavit of such other matters, if any, as the judge shall require, the judge may make an order for the administration of the estate of the deceased, with such variations, if any, as the judge shall think fit. This order is to have the force and effect of a decree to the like effect made on the hearing of a cause or claim between the same parties.

A special case may also be filed, in order to obtain the opinion of the Court upon the decision of any question under Sir George T usher's Act, 13 & 14 Vict. o. 35; but as the Court can now make a merely declaratory decree, under 15 & 16 Vict. c. 86, the same end may be more conveniently obtained, in most cases, by a short Bill without interrogatories.

These are the principal alterations in the procedure of our Courts of Equity; some minor details of practice in which changes have been effected, it would be out of place to enlarge upon.

ERICSSON, JOHN, Engineer, a native of Sweden, but whose inventions have been brought before the scientific world in England and America, was born in the province of Vemeland in 1803. In 1814, by the friendship of Count Platen, who observed his mechanical tastes, he obtained a cadetship in a corps of Engineers. He subsequently entered the regular army as an ensign, and at length reached the rank of lieutenant. In 1826 he visited England in order to bring into notice a new kind of engine which he had invented, and worked at the Whitehall, by the withdrawal of the sensation of flame. The project failed from the impossibility of procuring suitable fuel for the engine. He competed for the prize which was offered by the Liverpool and Manchester Railway Company in 1829, for the production of the best locomotive engine, and was the first to run an engine at the rate of fifty miles an hour. Ericsson's subsequent career lay chiefly in America. In the Great Industrial Exhibition of London in 1851, several instruments for the measurement of distances at sea, for measuring fluids under pressure, and other similar purposes, appeared in the American department under Mr. Ericsson's name, and were described by him in a small work which he issued at the time. His name is chiefly known in connection with a project for a caloric engine, a British claim to the use of an object which, if accomplished would, by removing the necessity of carrying large cargoes of fuel, have effected a great commercial change in the intercourse between distant parts of the globe. As the project is a difficult one, it is probable that the British government referred its consideration, Mr. Ericsson tried it in America, and obtained sufficient co-operation to enable him to launch a vessel named after himself, and measuring 2000 tons. This vessel made a trial trip under steam in 1853, and then stopped short, and on his return she was struck by a squall, filled, and foundered close to the city of Jersey. The Ericsson was subsequently raised, and the caloric engine was replaced by a steam engine, which possessed some improvements devised by Mr. Ericsson. Mr. Ericsson was a member of numerous scientific societies and a knight of the Swedish order of Vas.

He died on the 2nd of November, 1863.

ERINITE. [Mineralogy, § 1.]

ERROL. [Parishes.]

ERROR, IN LAW. The mode of appealing from the judgments of the Courts of Common Law to the appellate tribunals constituted to rectify their mistakes by bringing error to their attention, is prescribed by the Common Law Procedure Acts of 1853 and 1854. These statutes have abolished writs of error in civil suits, and substituted for them a simple notice or memorandum of error, to the opposite party and to the Court, of the appeal having been given in. The practice is, that the writ of error is issued, and in so doing improved the jurisdiction of the Courts of Error. Formerly judgment could only be affirmed or reversed; but the Court of Error now give the judgment which was given below, and award all necessary process for giving effect to it.

ERYTHACA, a genus of Birds belonging to the family Sprotidae, the order Passeres, having the following characters:—Beak rather broad and depressed at the base, becoming narrower towards the point, and slightly compressed; upper mandible deflected and notched. Nostrils basal, lateral, oval, pierced in a membrane partly hid by feathers and hairs projecting from the base of the beak. Wings rounded; the three exterior quills graduated; the first only half as long as the second, which is shorter than the third; the fourth, fifth, and sixth longer than the third; the fifth the longest in the wing. The tarsus longer than the middle toe; the lateral toes nearly equal to each other is less than the middle. The wings with the claw of the hind toe longer and stronger than the others.

E. rubecula, Sylvia rubicula, Motacilla rubecula, the Robin Red-Breast, Robin-Redstart, Robinett, Roodlock, is so generally distributed over the British islands, and so universal in its habits, that all are sufficiently interested in its nest, to make themselves acquainted with its habits. These may be observed in any garden, field, or wood, for there is scarcely a hedge without its Robin inhabitant, and if Robins appear to be more numerous in winter than in summer, it is partly owing to the state of vegetation at the former season, which leaves them more exposed to observation, and partly because they resort to the habitations of men for food, when other means of supply fail. The song of the Robin is sweet and sensuous, but not very agreeable, as Selborne says, "The Robin sings all through the year. The reason that he is called an autumn singer, is, because in the spring and summer his voice is lost in the general chorus, while in the autumn it becomes distinguishable."

The Robin is one of the first to return, and the earliest to be seen moving in the morning, requiring apparently but little sleep."

This bird is very easily tamed, soon becomes familiar with those who feed it, and constantly builds its nest in places frequented by man.
other, and many instances have been related to prove that they pair for life. With all his interesting qualities the Rattle-tail proved a skilful fowl, and not only maintains his right against all intruders, but is said to kill those of his own family when they become troublesome to him. Robins breed early in the spring. The nest is composed of moss, dead leaves, and dried grass, lined with hair, and is generally placed on a bank or tree. It is frequently placed on a bank sheltered by brushwood, or a short distance above the ground in a thick bush or lane hedge, sometimes in a hole of a wall partly covered with ivy. The eggs are from five to seven in number, white, spotted with pale reddish-brown; the chicks, when hatched, are mostly covered with down, and the throat, and the upper part of the breast, reddish-orange; encircling this red is a narrow band of bluish-gray, which is broader near the shoulders; lower part of the breast and rear of the neck more brown; and under tail-coverts, pale brown; under surface of wing and tail feathers dusky gray; legs, toes, and claws, purple brown. The whole length of the bird is 6½ inches. The female is not quite so large as the male, and her colours are less bright. The young birds, after their first autumn moult, resemble adult females; but the red of the breast is tinged with orange, and the legs are dark brown. The Red-Breast is subject to variation in the colouring of the plumage. White and partly white varieties are rare.

(Yarrell, British Birds; MacGillivray, Manual of British Birds.)

ERYTHRIGIC ACID. [Chemistry, S. 2.]

ESTHALIAD, a genus of Birds belonging to the Passerines. The species are known by the name of Waxbills. They inhabit the Indian Archipelago and Australia.

ESZEK. [Essex.]

ESHAL. [Chemistry, S. 2.]

ETHALIC ACID. [Chemistry, S. 2.] ETHÁLAMÉ. [Ether, S. 2.]

ETHER. BUTYRIC. [Ether, S. 2.]

ETHYLAMINE. [Chemistry, S. 2.]

ETHYLE. [Chemistry, S. 2.]

ETHYLGLYCINE. [Chemistry, S. 2.]

ETYLL. [Chemistry, S. 2.]

ETYLL at the College of Physicians was born on York, March 10, 1767. His father rented a mill in the suburbs, and kept a baker's shop in the city; and the boy assisted in the shop till he was of age to be put to learn a trade. He had already shown a marked fondness for drawing, and his mother, as in after-life the great painter was fond of relating, had encouraged his propensities, while neighbours used to 'patronise' the inquisitive child with halfpence and pennies to buy chalk and pencils. In his twelfth year he was apprenticed to a painter at Hull, in which situation, over-worked, without friends and distant from his family, and denied the privilege of drawing, he appears to have at first led a very uncomfortable life. But after awhile his master was persuaded to let the boy 'at lawful hours' indulge his artistic tastes, and, though still without instruction, Etty soon began to acquire sufficient facility in drawing to make his companions in the painting-office desirous to possess, and some of them careful to preserve, his sketches and rude attempts at painting. At length, his seven years' apprenticeship having expired, he gave himself over to the pursuit of art to come up to London. His uncle, himself a skilful draughtsman, saw promise in the youth's erudite tastes, and generously afforded him the means of practically solving the question whether his inclinations were to be indulged or a profession was an impulsive move or the result of a native aptitude. At first, without any formal instruction, he drew, as he says in his 'Autobiographical Sketch,' 'from prints, or from nature, or from anything he could...his first academy being a plaster-cast shop, kept by Gianelli, near St. Paul's.' Having thus sufficiently mastered the difficult-
EUNICE, the property of the Royal Manchester Institution. In the Vernon Gallery are eleven paintings by Etty, of which the chief is his 'YOUTH at the Fow and Pleasure at the Helm,' and in the Shepherds Gallery are two others.

Etty is undoubtedly one of the greatest names in English art. He chose for himself a somewhat remarkable path, and in it he walked without a rival. His want of classical education—learned by himself mostly from Linschmidt's Dictionary—together with his deficiency in every kind of intellectual culture, except in the techniques of painting, of course militated against his taking a first rank as a painter of classic themes. All his works evince his having been a good academician, but his style has been influenced even with the poetry of Greece and Rome. But, allowance being made for these deficiencies, or rather regarding his pictures as the mere vehicles for the exhibition of the undraped human form, his paintings must be allowed to occupy a very high place in comparison with those of any other modern painter.

To the highest order of female beauty either in face or form he never attained—hardly pretended; yet there is nothing in his pictures to show that the artist was always conscious of a want in that respect. He knew too, and he had the confidence to feel, that art will make up in beauty what it lacks in the other qualities of life. If he had desired to be the painter of small girls, as he was, or the painter of young novices, or the painter of matronly ladies, he might have painted them with that grace and enjoyment, so much life and heartiness, and, looking at them as pictures, there is shown so remarkable a knowledge of the female form, and such facility in rendering it in free spontaneous action, as few if any modern artists of any country have equalled, and none even in olden times passed.

Etty towards the close of his life seems to have become especially disturbed by the strong remarks occasionally made on his choice of subjects, and still more on his mode of treatment. He was often referred to as a "painter of girls," as it has been spoken as though they thought so too, that the objections raised to so free a display of the female form on the score of morality, was in fact an implication that the painter was手册 of Mollusca belonging to the family Pyrnellidae, founded by E. Forbes, to receive forms that had not been previously referred to Eubranchiis and Odontocreats. The shell is elongated, and consists of many whorls, smooth, and polished; the apex of the spine has a persistent embryonic sinistral shell; the aperture subquadrate; peristome cartilaginous; columella not plaet, straight nearly so; operculum corneous, pyriform. There are four British species. E. solis (Eutima crassula, Jeffrey), E. acuta (Mollusca acuta, Philippi), E. affinis (Eutima affinis, Philippi), E. charis (Turborina cedrosa, Loven).
EUPATORIA, previously named Kostaf, a sea-port town in the government of Taurida, on the western coast of the Crimea, is situated on the north shore of the Bay of Kalmius, in about 45° 14' N. lat., 33° 25' E. long., 40 miles N.W. from Simpheropol the capital of the Crimea, and 46 miles N. by W. in a straight line from Sebastopol. There was in 1890, chiefly Tartars and Karaitic Jews, with a few Greeks and Armenians.

The port is shallow, allowing only vessels of about 8 feet draught, but tolerably safe and never frozen up. The bay fronting the town contains a number of islands, which may approach within cable's length of the shore, but it is exposed to the west and south winds which cause a heavy surf all along the coast.

The town, which is surrounded by an old crumbling wall, is ill built; the streets are narrow, crooked, and dirty; the houses, low and built of bricks and clay, open upon courts or gardens in the Turkish fashion, but present to the street only dead walls.

The principal buildings are a Russo-Greek church, several mosques, an Armenian church, two pretty synagogues belonging to the Karaitic Jews, a hospital, and the house of the governor, on the heights, surrounded by the district.

The principal industrial products are leather, felt stuffs, and wood-work. The town is famous for the preparation of the black lambkins, known in England as 'blacks' for the inland and foreign trade, with which it is the southeastern coast of the town on which a good deal of salt is gathered in summer.

The water in the town and neighbourhood is bad. Before the Russian occupation of the Crimea, Eupatoria, it is said, had a population of 30,000, and was the centre of all the export trade of the coast. In order to restore the prosperity of the place it was made a free port for a limited period from the year 1798, and its trade partially recovered, but subsequently dwindled away on the rise of Odessa. It still remains of importance in salt, corn, flour, hat, iron, leather, hiders, hatter, wax, hair, linen, etc. There is a quarantine station at Eupatoria.

Eupatoria is said to occupy the site of the ancient Eupa-toria, or Eupatoriensis, founded by Mithridates Eupator, and named after him. The Russians call it Eupatoria, but this is no proof that the two places are identical. Some authors say that the site of the ancient Eupatoria is marked by the village of Inkerman on the north shore of the Bay of Sebastopol, where there are ancient ruins. Be this as it may, Eupatoria was destroyed by Nadar in 1377, the Tartars taking possession of it about the year 1761, and then it was occupied by the Allies Sept. 13, 1854, and they held it till the termination of the war, when it was restored to Russia.

EUXENITE. [MINERALS, S. 1.]

EVIDENCE. Great and important changes have been made during late years in the Law of Evidence. Not only have the means of obtaining and producing evidence been simplified, and facilities in doing so afforded to the officer; but all the former disqualifications of the parties to and of the persons interested in the result of the proceedings have been entirely removed. The most important practical improvements have been in our Courts of Common Law, the want of a complete discovery by the oath of the parties having formed till recently one of the greatest and most prominent defects in the procedure of the court. The law has now been extended to allow such a discovery, by going through the expense and circuitry of a Court of Equity, and therefore it was sometimes had by consent, even in the courts of law. But as it had long been established in our Courts of Equity, and as it seemed to be in the interest of justice that it should in the same way be allowed in the courts of record, in the examination of the same facts, a discovery by the oath of the parties should be permitted in some courts, and denied in others, the same power of compelling a discovery was at last conferred on the Superior Courts of England by the 6 & 7 Will. 3 Court of Chancery. A second defect in the procedure of the Courts of Common Law was of a nature somewhat similar to the first; the want of a compulsive power for the production of discovery by the oath or examination of third persons they can generally be obtained by rule of court, or by adding a clause of requisition to the writ of subpoena, which is then called a subpoena duces tecum. But in mercantile transactions generally, the right of the party's own books is frequently decisive; as a matter of course of fixing a bill in equity, an original power for the same purpose was also conferred on the courts of law, by the statute 14 & 15 Vict. c. 99.

This power to compel a party, on the application of his opponent, to produce his books only was exercised, however, where the applicant can satisfy the court or judge applied to, that the document, of which he seeks the production, is in the possession of his adversary. If he cannot do so, his application is rejected; and the only alternative is to institute discovery from his opponent, if he has, in fact, the documents of which inspection is sought, which he is enabled to do by the Common Law Procedure Act, 1854. Upon an affidavit of his belief that any document, to the production of which he is entitled, is in the possession or power of the opposite party, the party against whom such application is made may be ordered to answer, on affidavit, what documents he has in his possession or power relating to the matters in dispute, or whether he has procured or used the custody of such documents, and whether he objects (if so, on what ground) to the discovery of such as are in his possession or power. Upon this answer being made, the court or judge may make such further order as is just; for the party may have the documents, and yet have good cause for withholding them.

Until recently the Courts of Common Law possessed no power of compelling the discovery by one party of facts exclusively within the knowledge of his adversary. Each party may so doubt be called as a witness by his opponent; but this does not always the difficulty for a party of course, if what his adversary will swear, will not, except in the most desperate emergency, put so interested a witness into the box. For the discovery, previous to the trial, of facts as well as of documents, is the object of the act of Parliament of 1854; but to resort to a Court of Equity. The Common Law Procedure Act, 1854, now, however, enables either party, by leave of the court or a judge, to interrogate his opponent upon any matter as to which discovery may be sought, and to require such party to answer the questions, within ten days, by affidavit, sworn and filed in court. By thus affording an opportunity for the examination of the parties upon matters relating to the question in dispute, prior to the trial, facts important for the applicant's case, but exclusively in the knowledge of his adversary, may be discovered and produced, but the trouble and expense of producing evidence of facts which he is prepared to admit may be entirely saved; while such an examination may in some cases tend to make manifest the correctness or falsity of the adversary's grounds, and thus aid to a proper and peaceable litigation.

With regard to parol evidence, or witnesses, the law now bring them in by writ of subpoena ad testificandum, now runs (by statute 17 & 18 Vict. c. 34), into Scotland and Ireland, thus dispensing with the necessity of a commission to examine witnesses, which issues when a witness is abroad, or so ill as to be unable to attend and give evidence.

With regard to witnesses, the general proposition now holds that all witnesses, of whatever religion or country, that have the use of their senses, are to be received and examined, for such are competent witnesses, though the jury from other circumstances will judge of their credibility. The law formerly excluded such persons as were infamous, or were interested in the event of the cause. Infamous persons are such as may not act as witnesses by law, and are excluded from the jury; such as are potential witnesses, from the law. The law has thus expelled not only the parties to the cause, but any one who had the most minute interest in the result; for every person so circumstanced, however insignificant his interest, was presumed incapable of resisting the temptation to perjure; as perjury is the number one crime of every judge, and every judge is a potential perjurer committed under circumstances especially calculated to excite suspicion. But as it is perfectly obvious that any witness who can throw any light upon the subject, should be allowed to appear in court, and the rule is one which observation as might be made, either as to his means of knowledge, or his disposition to state the truth, the stringent rules
of our former law have been gradually relaxed by a series of modern statutes. The first inroad on the systematic exclusion of evidence, which was the result of the former state of the law, was made by the statute 3 & 4 Will. 4. c. 45, s. 66, which has been already mentioned, and is only again referred to for the present purpose. The principle involved is that no man shall be required in order to render the rejection of witnesses on the ground of interest less frequent, if any witness should be objected to as incompetent, on the ground that the verdict or judgment in the suit would be admissible in evidence for or against him, he should nevertheless be examined; but in that case the verdict or judgment should not be admissible for or against him, or any one claiming under him.'

A much greater improvement was, however, effected by the statute 5 & 6 Vict. c. 23, which made it competent for the ground of interest in all persons, except the parties to the suit, or the persons whose rights were involved therein, or the husband or wife of such persons. The advantages found to flow from this alteration in the law led to the statute 16 & 17 Vict. c. 62, which excluded all persons directly interested in the suit) was repealed. By the second section, the parties are made competent and compellable to give evidence on behalf of either or any of the parties to the suit in any court of justice. The third section of the statute provides that it shall not render any person charged with an offence competent or compellable to give evidence against himself, nor shall it render any person compellable to answer an interrogatory in his own behalf, nor shall it render any husband or wife competent or compellable to give evidence for or against his or her husband, nor any wife or husband of such person, without the particular person, that it shall not apply to any proceeding instituted in consequence of adultery, or to any action for breach of promise of marriage. It was decided, soon after it had become law, that the second section of the statute did not render a wife admissible as a witness for or against her husband, and, accordingly, the statute 16 & 17 Vict. c. 53, was passed, enacting that the husbands and wives of the parties to any suit, or of the persons on whose behalf any such proceeding is brought or defended, shall be competent and compellable to give evidence on behalf of either party or any of the parties. Neither husband nor wife is compellable, however, to disclose any communication made or received during marriage; and neither party is a competent witness in a criminal proceeding, or in any proceeding instituted in consequence of adultery. By these several statutes all rules tending to the exclusion of evidence have been abrogated, except in the particular instances above mentioned. (Blackst. 'Comm.' Mr. Kerr's ed. 1756).

EXCELMANS, REMI-JOSEPH-ISIDORE, BARON, Marshal, was a native of Bar-le-Duc, where he was born November 13, 1775. He entered the army very young, and first drew attention to his services, in 1798, whilst under General Poniatowski, in the campaign against the conquest of Naples. In 1800 he became aide-de-camp to General Broussier; but exchanged that for the same post under Murat. At the combat of Wurtemberg, on the Danube, October 6, 1805, he had three horses killed under him; and being commissioned to lay the numerous flags taken from the enemy at the feet of Napoleon I., he received from the hands of the emperor the decoration of officer of the Legion of Honour. On September 18, 1806 he was made colonel of the first regiment of Chasseurs, and was mainly instrumental in the capture of Posen, in Poland. He was afterwards engaged at the doubtful battle of Eylau, and for his conduct in that action (1807) he was appointed to command a brigade, and placed on the staff of Prince Murat, whom he afterwards accompanied to Spain. It was General Exelmans who was commissioned to head the escort by which King Charles was attended to Bayonne, after he had been induced to abdicate in favour of his son. A few days after this special service, Exelmans was arrested, with other officers, by order of the King, whereupon he remained a prisoner until 1811. On his release he again joined his former general, who had ascended the throne of Naples. Sent to Russia in 1812, in Junot's corps, as second in command, and having distinguished himself at various times, he was created a general of division, September 8, 1812. Savary, in his 'Memoirs,' ascribes entirely to Exelmans the merit of saving the remnant of their corps, which returned home after that arduous campaign.

In 1813 his division was placed under the orders of Marshal Macdonald; he took an active part in the operations in Saxony and Silesia, and was rewarded with the cordon of great officer of the Legion of Honour. In 1814 he commanded the cavalry of the imperial Guard, and was made a general of division by Napoleon to defend the French territory. After the return from Elba, General Exelmans was called to the Chamber of Peers, June 3, 1815; and despatched to join the army of the north. He was not present at Waterloo, but he had the honour of returning back his division to the walls of Paris, in time to defend the capital, and to check the advance of the Prussians, whom he defeated at Vernailles in the last action of the war. Exelmans was included in the decree of July 24, 1816, and banished from France with many others, but after seven years of exile, returned to his native land. It was not until 1819 that he was permitted to return to France, during the ministry of Marshal Gouvion Saint-Cyr. In 1831 Louis Philippe restored to him his title and rank in the Chamber of Peers.

Louis Napoleon raised him to the dignity of Marshal of France in the early part of 1849, and nominated him Chancellor of the Legion of Honour in August of the same year. On the 2d of December, 1851, Marshal Exelmans powerfully assisted in securing to the government of Napoleon the faithful adherence of the army. On the 3ist of July 1855, the Marshal was on his way to the house of the Princess Mathilde, in company with one of his sons, when he was suddenly jerked from his horse, and fell on the road, not far from the house, and died seven hours afterwards, and expired at two o'clock the next morning.

(Rabbe; Savary, Memoires; Biog. des Contemp.; Dictionnaire de Conversation.)

EXEMPTION. [Chemistry, S. 2]}

EXECUTION. [ATTACHMENT OF DEBT, S. 2; DETINER, S. 2; GOOZ, S. 2; EXEMPTION, S. 2; PANTRY, S. 2, EXHIBITION, S. 2.]

EXHIBITION OF 1851. The great Industrial Exhibition of 1851 was in itself an event of so much importance, one which excited such very general interest, and has been the parent of so many other exhibitions of a somewhat similar kind in different countries, that without entering upon the larger question of its initiatory or immediate influence upon manufacturing art and skill, or commercial enterprise—it may be useful to present in this work a brief summary of facts and figures illustrative of the history of the undertaking.

There had been industrial exhibitions in England and on the Continent, but they had been of a more or less local character, or at the utmost confined to the manufacturers of the country in which they took place. In England there had been the exhibition of 1816 held in the Haymarket, and another at the Royal Academy in 1826. This was in 1826 that the first real attempt was made to give the manufacturing art an impetus by a national exposition. Prince Albert was president. On its first announcement the project was coldly received, and some three years were suffered to elapse before it was again brought distinctly before the public. Meantime the annual exhibitions of the manufacturers were continued, and the feather trades and commercial men began to feel increased interest in the proposal. By the beginning of 1849 the council of the society had matured a plan, which in March of that year was submitted to the House of Commons, and was presented as an application for public aid. It was in the nature of a request for a parliamentary grant for pecuniary aid. Prince Albert, who had all along warmly supported the proposal, conceived that the time had arrived for imparting to it a much more magnificent form, by throwing the exhibition open to the industry of the
world. The council adopted his suggestion, and measures were taken for enlisting in behalf of the scheme the sympathy of the city in its promulgation, and then those of every other nation. The idea of an International Exhibition of Industry at once seized the general mind. At the preliminary meeting held in the city under the presidency of the Lord Mayor, for the purpose of enunciating the scheme, it was received with the utmost favor, and the provinces speedily gave in their cordial adhesion. The Council of the Society of Arts, which in the first instance assumed the direction of the undertaking, entered into contract with Mr. E. M. Wyon, as well as with Mr. W. M. Owen, for the purpose of publishing a prospectus and promoting the scheme. Upon the 1st of January 1851. a Building Committee, to whom was entrusted the entire arrangement of the Exhibition, was appointed. The great meeting was held at the Mansion House, at which the anxious desideration of various influential merchants and manufacturers was announced, and a general subscription was inaugurated with a view to raising funds for meeting eventual expenses. This large subscription was followed by corresponding meetings in every part of the country, and it was soon made evident that ample funds would be forthcoming. In fact a total of very nearly 80,000L. was ultimately reported to the Commissioners as subscribed, though only 87,000L. was paid into their bankers—upwards of 11,000L. having been somehow absorbed in the several localities as expenses. On the 21st of February, the Commissioners were able to make a public announcement of the general plan of the Exhibition, and to communicate the royal permission to hold it in Hyde Park.

The site granted for the building was on the south side of Hyde Park, between Kensington Drive and Rotten Row. The Commissioners announced that the building would cover an area of eleven acres, and that the transept and base of the great central building was the reception of goods by the 1st of January, 1851; that from that day to the 1st of March following goods would be received, and that the Exhibition would be open to the public on the 1st of May, 1851. In March 1850 the Building Committee appealed to architects and engineers to assist them with sketches and suggestions as to the form and general arrangements of the building required for the Exhibition. This appeal was responded to by a large number of professional men, including several foreign architects. In the course of May the Commissioners announced that they had examined the 243 designs sent in, but though several were of sufficient excellence to obtain special commendations, they were unable to select any one design which fulfilled all the conditions prescribed by the nature of the undertaking. Out of the 358 designs, however, singled out by the Commissioners for special commendation, and it was noticed as a curious circumstance that, though only 35 of the competing architects were foreigners, of the 18 of them specially distinguished only three were Englishmen. The Committee, being unable to recommend any one of the designs for adoption, the Commissioners stated that they had derived much valuable suggestion from the plans to guide them in preparing a design. After much deliberation by the Commissioners, a building was proposed which was to be 2000 feet long, 400 feet across, and to cover upwards of 20 acres. It was to be constructed of brick and lighted by skylights. The great feature of the building was to be a grand central hall, in shape a polygon of 16 sides, the main walls, which were to be of brick, being carried up to a height of 60 feet, and it was to be covered with an iron domical roof, much larger than any hitherto constructed, being 800 feet in length, and 300 feet in breadth, and running from St. Paul's, and 48 feet larger than that of the Pantheon of Rome. The report of the Building Committee gave general dissatisfaction in various ways, but their design—so obviously the result of a system of disinterested and forth a storm of diabolical disapprobation. For awhile the whole scheme seemed in peril, when Mr. (now Sir Joseph) Paxton came to the rescue by proposing an entirely new plan, that of a vast building of iron and glass resembling in its general principles the great conservatory at Chatsworth. This plan was at once adopted by the Commissioners, and put into execution at Chatsworth. Having powerful influence, he was enabled—though at this late hour when tenders had been publicly invited for the committee's design—to obtain permission to build his design before the Commissioners and his president. Its singularity and novelty were thought quite sufficient to meet the criticism, as well as the great comparative facility with which it could be erected and removed, at once commanded their approval. With the general public it from the first became popular, and as soon as the contractors, Messrs. Fox and Henderson, undertook its erection upon terms which removed all doubt of its economy as well as practicability, the Commissioners determined upon adopting it, and accepted Messrs. Fox and Henderson's tender. They were to receive 79,300L., the materials to be furnished at their own cost.

From this time all proceeded rapidly and smoothly. The contract was signed on the 26th of July; on the 80th the contractors obtained possession of the site; on the 26th of September the first column of the building was erected, and on the 19th of the 4th of October the foundations were laid. The contract was completed by the 31st of December the building was sufficiently advanced to allow of a lecture being delivered within it to the members of the Society of Arts, and on the 3rd of February, 1851, the completion being formally handed over to the Executive Committee.

The form and character of the building are too well known to need any detailed description. It will be enough to say, that its entire length was 1851 feet—its breadth, 405 feet, and its height, as far as the main roof, 80 feet. The upper story was 26 feet long by 48 wide. The central portion was 120 feet wide by 64 high; on either side of this was another portion 73 feet wide by 44 high; and the north and south portions were 72 feet wide by 24 high. The portions or great avenues here described ran east and west through the building: very near the centre the transept crossed, with a width of 75 feet and a height of 103. The entire area was 772,784 square feet, or about 19 acres—nearly seven times as much as St. Paul's Cathedral. The entire ground area was divided off into a central nave, four side aisles, and several exhibiters' courts and avenues. There were 3 entrances, with 8 pay places to each, and 18 doors for exit. Four galleries ran lengthwise along the sides of the building, and others around the transept, with direct access to the central nave, and double staircases. The iron columns in the building, with, which their connecting pieces, were about 20 and 24 feet high respectively, were about 3300 in number; and there were 1074 beam pieces beneath the columns, on which the whole structure rested. There were nearly 3000 girders, of three different lengths, 24, 48, and 72 feet, and of five different weights, 12, 15, 35, 120, and 160 cwt. Altogether there were about 4000 tons of iron built into the structure.

In the woodwork for the glass roof, the Paxton gutters were arranged 8 feet apart, with a ridge between every two. The squares of glass were 49 inches by 10. Besides the 17 acres of glass for the roof (none being wanted for the open air) there were about 1300 vertical glass ashes. The ground floor and the galleries contained 1,000,000 square feet of flooring. Of sash bars there were 200 miles, and 20 miles of Paxton gutters. The total woodwork in the building was estimated at 860,000 cubic feet. The form of the dwarf columns was specified, and the design of the cast iron that of the sash-bars, so likewise was the size of the panes of glass. The structure itself was built up of a series of bays or cubic compartments, each 24 feet square; each one being built up of, two, three, or four bays, so as to give the imported girders very ingeniously put together. Thus the entire ground-plan may be regarded as a series of these squares, the parallelogram being 77 of them in length and 17 in width—columns being of course omitted and longer girders substituted to form the nave, courts, and transept. The additional portion on the north side of the building was
The entire number of visitors was about 16,000.

The Exhibition was formally opened by her Majesty, on the 1st of May, 1851; it remained open 144 days, being smaller than the committee had calculated, and the arrangements were made accordingly. The Visites paid to the Exhibition was 6,063,986, being a daily average of 43,111. This average was not reached till June, but from that time till the close of the Exhibition there was comparatively little variation till the last week when the average was about 50,000. The number of visitors during this week was so extraordinary that we are tempted to set down the figures in detail.

Monday, October 6th, 107,316; Tuesday, 109,915; Wednesday, 109,760; Thursday, 90,613; Friday, 64,913; Saturday, 53,061. The following are three pairs of column of numbers:

1st number of visitors to the Exhibition was: Tuesday, 109,915; Wednesday, 109,760; Thursday, 90,613; Friday, 64,913; Saturday, 53,061; Sunday, 61,666. The six million visits paid to the Exhibition plainly indicate but very roughly the actual number of visitors. Some persons went doubtless ten or even twenty times during the season, a very large proportion went twice. After weighing the statistics of all kind of attendance, it is evident at the conclusion of the probable average of visits would be about three, and that consequently about two millions of persons visited the Exhibition.

An attempt was made to arrive at the number of foreign visitors by an examination of the number of persons whose passports were furnished by the French, German, Italian, and other governments, as well as by the Home Office, for all steam plyers passing the ports of England and the continent of Europe, and of returns furnished by the United States Legislation, from which it appeared that the total number of all who arrived from all parts of the world, between the 1st of April and the 30th of September, 1851, was 35,037; a number very far below what the common imagination had supposed. During the same period in 1850 the number of aliens who landed in England was 15,616, so that the government was obviously in error in supposing that they could not have visited this country for the express purpose of seeing the Exhibition, though probably a few of the remainder left these shores without visiting it. The largest number of visitors was from France, 9,477; then came Germany, 10,400, the United States, 6,000, Belgium, 3,700, Holland, 2,900. But if the numbers be considered in relation to the population of the several countries, it will be seen that Holland sent most visitors, Belgium next, then France, Germany, and the United States. The respective proportions of town and country visitors was attempted to be arrived at by comparing the arrivals in London, from April to October, by steam-boats and railways—of course a very rude method, but the only available one,—when it appeared that the arrivals in London were 2,161,647, from steam-boats and railways, of a number of 1,445,487. But as against this there had to be set off the regular yearly increase in the number of travellers by railway, and other allowances to be made; the inference was drawn that the number of persons who came from the provinces, to view the Exhibition slightly exceeded a million; roughly, we may say that the Exhibition was visited by about a million of the inhabitants of London, the same number from the provinces, and about 50,000 foreigners.

The details of the jury awards do not come within our present object; but the following are the general results, as affording materials for comparison.

There were 186 * Council Medals," 2976 "Prize Medals," and 204 "Honourable Mention," making a total of 5948 through all departments of the Exhibition. All kinds of numbers, up to the estimated number of 16,000, about one-thousand were deemed worthy of some kind of recognition. Of the total number, 2039 were taken by exhibitors belonging to the United Kingdom, 3080 by foreign exhibitors, 123 of whose names were derived while of the remainder 1600 came from the United Kingdom, and about 1070 from the Belgian colonies.
took off three-fifths of the honours. The greatly-coveted 'Council Medals' were awarded in the ratio of 79 to British and 87 to foreign exhibitors; the 'Prize Medals,' 1244 British and 1632 foreign; the 'Honourable Mentions,' 716 British and 1396 foreign.

In relation to different classes of exhibited articles, there were a few striking and instructive facts. In machinery, in manufactures, in metal, and in glass and porcelain manufactures, the prices of tells combined, was the ratio of three-fifths to two-fifths British. But in the section of raw materials for food and manufactures, the competiton was less keen; they were as many as prizes as the British (908 to 265). It would be a hasty generalisation to infer from thence that Britain is a manufacturing and not a producing country; but the simple facts themselves are worthy of note, whether we theorists concerning them or not.

The great honours, the Council Medals, were very unequally distributed as regards the classes of exhibited articles; for out of the whole number of 168, no less than 88 (more than one-half) were awarded for machinery alone. This is a significant fact; showing that the Juries, or rather the Council of Chairmen, were not deterred by the gorgeous display around them from doing justice to the great working agencies by which modern wealth is produced. What would be charged on the head of financial results. The receipts at, and in relation to, the Exhibition, by which it was made a self-supporting concern, were truly remarkable. The admissions were by season tickets, and by payment at the doors of season tickets. The receipts were 10,829, 10,829 men's tickets at three guineas each, and 5615 ladies' tickets at two guineas each, were sold before the Exhibition commenced, making together 19,607, for which more than 63,000L. were paid. About 6000 more tickets were sold during the Exhibition; the interest felt by the ladies in leaving the Exhibition, and it is worthy of note that of these 6000, the ladies took off nearly a thousand more than the gentlemen. The smallest money receipt at the doors was on the second day after the opening: the largest was on the third day before the closing; these sums were 32,685L. and 32,685L. respectively, the former in sovereigns and the latter in shillings. The average of the daily receipts at the doors was 2323L. There were two admission days at 1L., twenty-eight at 6L., thirty at 2L. 6L., twenty-eight at 2L. 6L., and 6500 for season-tickets only, two for exhibitors and their friends, and one for exhibitors and the officials; making up the total of a hundred and forty-four. The total receipts amounted in round numbers to 506,000L., that amount being thus made up: subscriptions 97,600L., entrance tickets to the Exhibition 232,685L., catalogue contracts, royalty on medals, washing-rooms, &c. 13,200L. The total expenditure connected with the Exhibition was about 330,000L., leaving a surplus of 176,000L. in the hands of the Commissioners, but the final balance, including the Commissioners' expenses, was 25,000L., and the receipts were 186,436L. How to apply this large surplus was a most important question. The original announcement to the subscribers was to the effect that, should any surplus remain, it was the intention of the Commissioners "to apply the same to purposes strictly in connection with the ends of the Exhibition, or for the establishment of similar exhibitions for the future." This latter purpose they were however led on more mature reflection to abandon, and they arrived at the scheme of distributing part of the surplus proceeds of a temporary, partial, or local character, they could in no way so properly act in the spirit of the pledges held out to the public as by assisting in carrying out a comprehensive scheme which should have for its object "to increase the means of industrial education and exert the talent, skill, science and art upon productive industry": they having been compelled by their experience, in connection with the Exhibition, to regard as a matter of urgent importance the "systematically inducing a feeling of respect for, and a spirit of advancement of, the class of the community, to enable them to maintain their pre-eminence in the markets of the world." In their Second Report (1852) the Commissioners review the existing means and deficiencies of the country in respect to these matters, and come to the conclusion that they "...merit the serious consideration of those who have to meet the requirements of the public and the Government. The sum in the hands of the Commissioners would go but a small way towards meeting the requirements of the case. It would suffice however to prepare the ground, and they determined so to employ it, leaving it to the public to complete the work when its importance and necessity shall have become fully understood. They felt sure that they could..."
their various branches, and to "establish a central point of
union for those who in so many ways devote their
energies to the same ends, especially in respect of the practical
application of science and art to productive industry." They
thus, in connection with the enlarged system of industrial
instruction of which they urged the necessity, hoped that
instead of being behind most other European nations we
might take the lead in industrial science and art, as well as in
the fostering of industry and enterprise. But the Com-
missioners have been deemed to see their scheme, like so
many another castle in oldland, reduced to much humbler
dimensions than that in which it at first presented itself to
their imagination. As a first step it was proposed to remove
the National Institution to a position nearer the centre,
and from there to build a thousand feet (the depth being practically
unlimited) nearly facing the site of the Exhibition of 1851, was proffered
by the Commissioners. A Committee of the House of Commons
in 1850 reported unanimously in its favour, and the Govern-
ment appeared to be inclined to support the proposition, but
the Commissioners appointed to consider the subject in 1857
decided by a majority of three votes to one against removing
the national collection from Traflagar Square; and in conse-
quence of their report a survey has been made of the ground in
the area, and estimates given of the cost of enlarging the present
building, or erecting a new one on its site. So with reference
to the Art-Collections in the British Museum, the feeling of the
Trustees has been decidedly expressed against any move-
ment. So again, a new building has been erected for the
collection of vegetable products at Kew, which were pro-
posed to be taken to Kensington. Then the Learned Societies were averse to moving so far westward, and
providing a new seat for their accommodation. Some of the
Rother

This is a very wide circulation. One of the

principles for the interpretation of prophecy which he highly
laboured to establish and explain, was, that the delin-
quencies of events in prophecy are not applicable to the destinies
of individuals, but to those of governments and nations. His
writings are numerous, and we can only mention a few of the
most important:— 1. Home Mosaics, or a View of the
Masonic Records, with respect to their Coincidence with
Prophetic Antiquity, their internal Credibility, and their Con-
nection with Christianity, 2 vols. 8vo, 1801; 2. A Dissertation
on the Mysteries of the Cabyl, or the great god of Phœnicia,
Samothrace, Egypt, Troas, Greece, Italy, and Crete, 2 vols.
8vo; 3. Dissertation on the Prophecies that have been fulfilled,
are now fulfilling, or will hereafter be fulfilled, relative to
the great Period of 1290 Years, 2 vols. 8vo, 1808; 4. A General and Connected View of the Prophecies relating to
the Conversion, Restoration, Union, and future Glory of
Judah and Israel, 2 vols. 8vo, 1808; 5. The Origin of Pagan
Idolatry, 3 vols. 8vo, 1816; 6. A Treatise on the Genius and
Object of the Patriarchal, the Levitical, and the Christian
Dispensation, 2 vols. 8vo, 1823; 7. The Sacred Calendar of
Prophecy, or a Dissertation on the Prophecies which relate to
the Grand Period of Seven Times, 3 vols. 8vo, 1828; 8. Eight Dissertations on certain connected Propohetical Pas-
sages of Holy Scriptures bearing more or less upon the
Prophecies; 9. The Deliverer, 2 vols. 8vo, 1845.

FAR

FABER, REV. GEORGE STANLEY, was born on the
25th of October 1773. He was the eldest son of the Rev.
Thomas Faber, who was descended from a French refugee
who came over to England after the revocation of the edict
of Nantes. He was educated at the grammar-school of
Heppenheim, near Halifaks in Yorkshire, where he remained
until 1790, when he entered University College, Oxford.
He took his degree of B.A. in 1792, and before he had
reached his twenty-first year, was elected a Fellow and
Tutor of Lincoln College. He took his degree of M.A. in
1796, served the office of Proctor in 1801, and in the same
year, as Bampton Lecturer, preached the discourses which he
shortly afterwards published under the title of "Home
Mosaics." He took the degree of B.D. in 1803, and married
in the same year. Having by this step relinquished his
fellowship, he went to reside with his father at Calverley,
near Bradford in Yorkshire, where for two years he acted as
curate. In 1805 he was collated to the vicarage of Stockton-
upon-Tees, in the county of Durham, which he resigned in
1811, and was appointed a small, in the same county. In
1811 he was collated to the vicarage of Long-Newton, where
he remained till 1831, when Bishop Burgess presented him to
a prebend in the cathedral of Salisbury. In 1832 Bishop
Van Mildert gave him the mastership of Sherburn Hospital,
making him also vicar of the parish, when it became a vicarage
of Long-Newton. During his mastership he considerably
increased the value of the estates of the Hospital. He rebuilt
the chapel, the house, and the offices, and greatly improved
the grounds; he augmented the incomes of the incumbents
of livings near him, by giving them large rents of the estates
of their churches, and erected agricultural buildings on the farms.
He died at his residence, Sherburn Hospital, on the 27th of
January, 1854.

1850 Theological writings of Mr. Faber, particularly those
on prophecy, had a very wide circulation. One of the

the promotion of Industrial Art and Science; and to which
was intrusted the direction of all previously existing govern-
ment scientific and art institutions, and the encouragement
of all local institutions of a similar order. [Sources and Art.
DEPARTMENT OF, S. 3.] Upon the estate purchased by
the Commissioners a great practical step towards the realisation
of a main feature of their scheme has been taken. In
a building which has been adapted to the purpose, instruction
in practical science and art, and meetings of the highest
standing is regularly given, and an excellent library
has been formed for the use of the students; more strictly
scientific courses of lectures are at the same time delivered
at the Metropolitan School of Science, in Jermyn Street—
though the Commissioners have not yet united a school nearly
residential that resembling that desired by the Commissioners. In
a spacious temporary iron building at the south-eastern
angle of the estate have been brought together for public
exhibition industrial, educational, and art collections, which,
though as yet necessarily very incomplete, and in some
parts only rudimentary, are all of great value and interest;
and having been arranged and shown so as to suit the
convenience of the industrial classes, they have proved
remarkably attractive. These collections include a Museum
of Patent Inventions, a Trade Museum, a Museum of Ancient
and Modern Manufactures, a Museum of Animal Products,
and a Museum of Domestic Economy, the Architectural Museum
formerly exhibited in Cannon Row, the fine collection of
paintings and engravings at Oxford, the museum of Mr. Shee.
shanks, and collections of British sculp-
tures, drawings, etchings, &c. At the present moment [March
1850], a collection of models and drawings submitted in
competition for the Memorial, to be erected in commemora-
tion of the Great Exhibition is also being exhibited in the
'south Kensington Museum,' but the true memorial of
the Exhibition of 1851 will be the Exhibition Estate, with the
Museums of Art and Industrial Science collected upon it.

EXILE. [See Sav厌恶 Patents, &c.] EXOCUS. [Fighting Pests.
EYEBRIGHT. [Euphrasia.]
1811) work which had some reputation, and contributed to the 'Agricultural Magazine.' Farey, junior— with his brothers and sisters, becoming at an early age attached to kindred pursuits— was engaged in making drawings for the plates of 'Rosa's Encyclopaedia,' 'The Edinburgh Encyclopaedia,' 'Tilloch's Magazine,' 'Gregory's Mechanics,' and 'Mechanical Dictionary,' the 'Antiquary,' and many other publications, of some of which he contributed articles and sketches. To have been the inventor of these Lowry, the engravers, has been ascribed in a great degree, the merit of introducing a better explanatory style of illustration in scientific works, and which has not since been improved upon in this country, or in France. Races of Kindred, and mechanical facilities. His acquaintance connected him with eminent scientific men of the time; and thus with Huddart, Josep, Myine, and Bennie, he was engaged in the publication of Smollett's reports and drawings. In 1807 he had received the silver medal of the Society of Arts for an instrument for making perspective drawings, described in their 'Transactions,' and in 1813 the gold medal was awarded to him on the invention of his machine for drawing ellipses. This last he afterwards improved upon, besides making many improvements in the scales and drawing instruments now in use. In 1819 he went to Russia, and was engaged in the construction of iron-works. In Russia he first saw a steam-engine indicator—an instrument which it was attempted to apply to a great extent in England; but was then only manufactured, and was often employed to use them in disputed cases. In 1831 he resigned his professional engagements in favour of his brother, and embarked in a lace manufactory in Devonshire, but gave that up in 1833. In 1830 he took the engineer's degree at the Ecole Polytechnique, and in 1831, on the failure of his brother's health, he returned to London, and from that time to near his death, which took place in his sixty-first year, on the 17th of July 1831, he was employed as a consulting engineer, or referee, in most of the novel inventions and litigation connected with steam, during the quarter of a century. For such duties he was peculiarly qualified from retentive memory as to details of machines and processes, names and dates, and from habits of conscientious and laboured attentiveness. He is said to have been reticent, and in the preparation of drawings for specifications, he was assisted by his wife, a lady of great scientific attainments. From the shock of her decease he never wholly recovered. Some time before, part of his library and documents had been burnt with his house in Guildford-street. Farey commenced a 'Treatise on the Steam-engine, Historical, Practical, and Descriptive,' (4to, London, 1827, with plates,) a valuable work, but which did not get beyond a first volume, and he was an active member of the Institution of Civil Engineers, from whose Report of 1851-62 many of these particulars are derived.

FARINGDON. [Farringdon.] F. A. T. (Tiers, Organo, S. J.)

FARRINGTON, G. P. F., one of the most prominent members of the French government, and a writer on subjects of political economy and social progress, was occupied during the greater part of his life as a journalist. His connection with the periodical press of Paris commenced about the year 1839; from 1836 to 1843 he was a contributor to the 'Courrier Français,' and was afterwards a leading writer in the 'Revue des Deux Mondes,' which is published on the 1st and 15th of every month, and occupies an influential place among those periodicals which are chiefly devoted to the discussion of questions of country, and the investigation of the actual condition of the various nations of the world. M. Léon Faucher was, during the last ten years of the dynasty of Louis Philippe, a member of the Chamber of Deputies for the department of Marna. He was re-elected by the same department in 1848 as one of its representatives in the National Assembly of the French Republic. He became Minister of the Interior, December 29, 1848, and held the office till May 14, 1849. He was again appointed Minister of the Interior February 3, 1853, and served in that capacity till January 29, 1855. M. Léon Faucher died on the 15th of December 1854, at Marseille.

M. Léon Faucher published in 1845 'Études sur l'Angleterre,' 2 vols. 8vo, Paris, a work of great weight, in which he treated of the districts of England—White-chapel, St. Giles's, the City; Liverpool, Manchester, Leeds, Birmingham, and adjoining districts—together with dissertations on the Bank of England, the Lower Classes, Middle Classes, Aristocracy, the Corn-Laws and the League, and the Balance of Powers. Several portions of this work appeared in 1845 and 1846 in the 'Revue des Deux Mondes,' and the description of Manchester had been translated into English under the title of Manchester in 1844; 'Represent Condition,' 12mo. The work is written in a fair and impartial spirit, and affords evidence of diligent research and patient investigation; but contains many mistaken views and exaggerated descriptions. Other dissertations by M. Léon Faucher, under the title where: —De l'Impôt, under the title: —Du Système de M. Louis Blanc. —De la Sitaition Financière et du Budget, 8vo, 1850, appeared originally in the 'Revue des Deux Mondes,' in 1849. He was a member of the Board of the Demonstration of Gold in several Countries, in Europe, by Mons. Léon Faucher; translated by Thomas Hanley, Junior, 8vo, Lond., 1853. These remarks appeared first in the 'Revue des Deux Mondes,' and were subsequently published, somewhat modified, in the Reports of the Académie des Sciences Morales et Politiques.

FAUJASITE. [Mineralogy, S. J.] FERRIERE, MISS, was born at Edinburgh, about 1752, the daughter of a writer to the signet, and was one of Sir W. Scott's colleagues as clerk of the Court of Session. This association almost necessarily produced an intimacy with the Scott family, and she had early access to the company of the best literary society of her native city. She was received into the society when Miss Scott, his first and only wife, died, and was introduced as an agreeable character, by "the very lively work entitled 'Marriage.'" In the latter part of his life, when Miss Ferriere was one of his most trusted friends, her name occurs in his diary. Her novels are not entirely national; the characters are vigorously drawn, and the love of either fame or profit. Sir Walter Scott, indeed, says of her, that in conversation "she was the least exiguate of any author, female at least, whom I have ever seen." He adds: "she was a simple, full, and exact expositor of herREADY READER upon the grosser errors of human conduct; the sketches are relieved by scenes of harmony, which, if sometimes exaggerated, like those of Miss Burney, are certainly laughable.

Miss Ferriere passed a peaceful and quiet life in her native town, associated with all the more distinguished of her contemporaries, and respected for her kindness and urbanity by every one who knew her. She died, aged seventy-two, in November 1826. FEVEREWS. [Feverwms, S. J.] FIBROUS TISSUE. [Tiers, Organo, S. J.] FICHETELITE. [Chemistry, S. J.] FIELDSFARE. [Furniture.] FILDING, COPELY W. ATKINSON, was born about 1787, and belonged to a family several of the members of which were artists of greater or less ability. Copley Fielding exhibited his first pictures at the Artists' Exhibition, Spring Gardens, in 1810. It was by his water-colour landscapes that he first made people familiar with his name. He had made many attempts to achieve success as a painter in oil, in his paintings in water-colours that he will be remembered. Mr. Fielding began the practice of the art about the same time that Copley was successful. He succeeded in raising the practice of water-colour painting almost to the same extent of oil-colours, and Fielding devoted himself with thorough earnestness of purpose to the new art. From an early period in his career he became a teacher, and he had in that line an unequal measure of success, as
well in the progress of his pupils as in their number and social position. His success as a teacher of course did much to swell the ranks of his friends, and of course to raise the merits of his works effectually maintained. His course was one of steady prosperity, quite devoid of adventure. His time, was constantly occupied either in teaching or painting, or in those sketching excursions which were to furnish him with materials for his new picture. Mr. Fielding held the office of President of the Society of Painters in Water-Colours, and his position was generally recognized as that of the head and representative of this branch; he was, more kindly, no doubt, the object of the estimation in which his personal as well as professional qualities were universally held. He died March 3, 1856, in his sixty-eighth year, at Worthing, Sussex, where, or at Brighton, he had for a long period been accustomed to reside.

FIGITES. [GALLO DICHA]

FILICIES, or FILICA/CEA, a natural order of Plants, being the highest group of the class Cryptogamaceae, or Acro- gena. The species are few. These plants, consisting of leafy fronds, which are produced from a rhizome unfolding in a spiral manner, and traversed by veins which form definite parts on the under surface, and produce unilocular, rarely multilocular, cases containing reproductive spores.

These plants, which are so well known and of such importance in their study, and on modifications of which modern classifications depend, are the veins and organs of reproduction. The veins are either produced equally from both sides of a midrib, or they radiate from the base or axis of development, or from the extremity of the stem; these parts are either simple, or once or repeatedly dichotomously branched, or the primary veins are pinnate; the branches are simple or forked. Their apices are either free, or they are combined by various forms of anastomosis. The organs of reproduction consist of a sporangiferous receptacle, which is a thickened point or lengthened portion of the ultimate venales or veins. It is generally superficial, sometimes immersed in the substance of the frond, or considerably elevated, and is surrounded by various forms of anastomosis. The organs of reproduction are covered by the surface, or the surface, or the capsule, or the spore, or cases, are transparent, globose, oval, or pyriform unilocular cases, each girded by a more or less complete elastic articulated ring, or destitute of a ring; or sometimes closed, opaque, and multilocular, and usually pedicellate. The spores are collections of sporangia, and have the same form, position, and direction as the receptacles.

They are either naked, or each sorus is furnished with a membranaceous covering of various forms which raises from the receptacle. The sorus is covered or covered by a plane, or vaulted, or cup-shaped membrane, produced from the receptacle of each sorus, and is generally deciduous as it becomes reproductive. Often the entire margin (or lobules of the capsule) is of characteristic texture, and forms an accessory indusium. Sometimes the whole of each receptacle is included within a universal indusium which is formed by the revolute margin of fertile contracted fronds.

The following account of the reproduction of the Ferns is given in a Report to the British Association in 1851, on the higher Cryptogamous Plants, by Mr. Henfrey. Speaking of the Ferns, Mr. Henfrey says:—

This class formed for a long time the great stumbling-block to those who sought to demonstrate the existence of sexuality in plants. The young capsules were generally considered as the analogues of the pistillids of the Moosae, and the young abortive capsules which frequently occur among the fertile ones were supposed by some authors to represent a sex. Mr. Griffith noticed a structure which he was inclined to regard as the analogues of the antheridium in certain of the ramentae upon the petioles.

In the year 1844 Professor Nageli published an account of his observations on the germination of certain fronds, and announced the discovery of moving spiral frond stems closely resembling those of the Chares; on certain cellular structures developed upon the pro-embryo or cellular body first produced by the sperm. It is not worth while to enter into an account of these discoveries, as they have since been clearly shown to have been very imperfectly understood, and to understand that he only described one kind of organ, and from his description it is evident that he confounded the two kinds actually discovered, regarding them as different stages of one structure. The result of these observations was to destroy all grounds for the assumption of distinct sexes, not only in Ferns, but in the other Cryptogams, since it was argued that the existence of these cellular organs, producing spiral frond stems, the so-called spermatozoon, upon the germ-cells of the plants, is an assumption which is untenable as in any way connected with the reproductive processes.

But an essay published by the Count Suminski in 1848 totally changed the face of the question, and opened a wide field for speculation and investigation into the subject, just as the discovery of the sperm had fallen into disfavor. Count Suminski’s paper gives a minute history of the course of development of the Fern, from the germination of the spore to the production of the regular fronds; and he found this development to exhibit a highly characteristic structure in each of the cellular organs of two distinct kinds. The first, which he terms antheridia, are the more numerous, and consist of somewhat globular cells seated on and arising from single cells of the cellular Marchantia-like frond. The globular cell produces a single frond in each of which is developed a spiral frond, coiled up in the interior. At a certain epoch the globular cell bursts, and discharges the vesicles, and the spiral frond movements within the vesicles, and length make their way out through the base, and swim about in the water, displaying a spiral or helical form, and consisting of a delicate filament with a thickened clavate extremity; this, the so-called head, being said by Count Suminski to be a hollow vesicle, and to be furnished with a spiral filament within the vesicle. The spontaneous and voluntary movement of the filament is supposed to be effected.

The second kind of organ, the so-called ‘ovules,’ are fewer in number and present different character in different stages. At first they appear as little round cavities in the cellular fronds of the pro-embryo, lying near the center, and opening on the under side. In the bottom of the cavity is seen a little globular cell, the so-called ‘embryo-sac.’ It is stated by Count Suminski, that while the ovule is in this state one of the globular cells in each of the cavities comes in contact with the central globular cell. The four cells bounding the mouth of the orifice grow out from the general surface into a blunt cone-like process, formed of four parallel cells arranged in a squarish form, and leaving an indentation on the surface. From each indusium each of the four cells become divided by cross septa, and grow out until the so-called ovule exhibits internally a cylindrical form composed of four tiers of cells, the uppermost of which gradually converges and closes, leaving at the tip of the stem a swelling down between them. Meanwhile the vesicular head of one of the spiral frond stems has penetrated into the globular cells of the embryo-sac, enlarged in size and undergone multiplication, and in the course of time displays itself as the embryo, producing the first frond and the terminal bud, whence the regular fern-stem is developed. In considering the import of these phenomena, the author assumes the analogy here to be with the process of fertilization in flowering plants, as described by Schleiden, regarding the production of the embryo from the vesicular head of the spermatozoon, as representing the production of the phanerogamous embryo, from the end of the pollen tube after it has penetrated into the embryo-sac.

The preceding statement naturally attracted great attention, and since they appeared we have received several contributions to the history of these remarkable structures, some confirmatory, to a certain degree, of Sumin- ski’s views; others altogether opposed to them. Mr. Griffith published a series of researches on this subject, in which he subjected the assertions of Suminski to a strict practical criticism; the conclusions he arrived at were altogether opposed to that of the author, and he never observed the entrance of the spiral frond stems into the cavity of the so-called ovule. About the
same time M. Thuret published a series of observations on the 'Antheridia of Ferns.' In these he merely confirmed and correlated the spiral filaments respecting the antheridia, and did not notice the so-called ovules.

Towards the close of the same year Hofmeister confirmed part of Suminiski's statements, and opposed others. He stated that he had observed daily the production of the young plant (or rather the terminations of the young) in the interior of the so-called ovule; but believed the supposed origin of it from the end of the spiral filament to be a delusion. He regards the globular cell at the base of the canal of the ovule (this is the cell, or embryonal vesicle (the embryonic originating from a free cell produced in this), analogous to that produced in the pistillidia of the Mosses. He also describes the development of the ovule differently, saying that the canal and orifice are opened only at a late period, and the separation of the contiguous walls of the four rows of cells.

About the same time appeared an elaborate paper on the same subject by Dr. Hermann Schacht, whose results were also independent. He found the young terminal bud had developed in the cavity of one of the so-called ovules, which were developed exactly in the same way as the pistillidia of the Mosses. He stated also that the cavity of the ovule is not open at first, and he declares against the probability of the filament having been seen in it by others; he observed this, much less a conversion of one into an embryo.

In the essay of Dr. Mettenius, already referred to, an account of the development of the so-called ovules is given. His observations did not decide whether the canal of the ovule, which he supposed to be at first only a canal, was opened only subsequently, when it is entirely closed above. Some important points occur in reference to the contents of the canal. The contents of the canal in a mature condition consist of a continuous mass of homogenous tough substance, in which five granules, and here and there large corpuscles, are embedded. It reaches down to the globular cell, or embryo-sac, and is in contact with it. This mass either fills the canal or diminishes in diameter from the end of the canal down to the embryo-sac; in other cases it forms the cell represented by Suminiski, having a cavity enlargement at the blind end of the canal, and passing into a twisted filament below; in this latter shape it may frequently be pressed out of the isolated ovules under the microscope, and then a thin transparent membrane-like layer was several times observed in its surface. In other cases the contents consisted of unclotted vesicles, which separated or connected together.

"The embryo-sac consists of a globular cell containing a nucleus, and this author believes that the commencement of the embryo consists in the passage of the globular cell into this two, which go on dividing to produce the cellular structure of the first frond.

With regard to the contents of the canal the author says, 'Although the Filicidia of the Flora, to which I refer regard to the origin of the contents of the canal of the ovule, yet my observations on the development of the ovule do not allow me to consider them, with Suminiski, as spiral filaments in course of solution; just as little have I been able to convince myself of the existence of the process of impregnation described by that author. It rather appears to me that the possibility of the entrance of the spiral filaments and the impregnation cannot exist until the tearing open of the blind end of the canal in the perfectly-formed ovule, as after the opening of the so-called canal of the style in the pistillidia of the Mosses.

"Another contribution has been furnished by Dr. Mercklin, the original of which I have not seen, but depend on analyses of it published in the 'Botanische Zeitung,' and the Flora for 1851, and further in a letter from Dr. Mercklin to M. Schacht, which appeared in the 'Linnaea' at the close of last year.

He refers in a few subordinate particulars from M. Schacht, in reference to the development and structure of the prothallium, or pro-embryo, and of the antheridia and spiral filaments; but these do not require special mention, except in reference to the vesicular end of the spiral filaments, which is represented as having a residuum of the parent vesicle, from which the filament had not become quite freed. The observations referring to the so-called ovule, and the supposed process of impregnation, are very important; they are as follows:

1. The spiral filaments surround the ovule in numbers, frequently returning to one and the same organ.
2. They can penetrate into ovules. This was seen only three times in the course of a whole year, and under different circumstances. In a spiral filaments originating the antheridia, and did not notice the so-called ovules.
3. In the proximal part of the ovule, almost in every case, peculiar club-shaped granular mucilaginous filaments occur at a late period; these are a prolongation of the spiral filaments, acquiring a brown colour with iodine. These mucilaginous bodies sometimes exhibit a twisted aspect, an opaque nucleus, or a membranous layer, peculiarities which seem to indicate the existence of an organisation.
4. The spiral filaments are often at the lower capitate extremity, and have been found in contact with the embryo-sac, or globular cell, which forms the rudiment of the future frond.
5. The spiral filaments, which cease to move and fall upon the prothallium, are metamorphosed, become granular, and swell up.

"Hence the author deduces the following conclusions:

That these clavate filiform masses in the interior of the ovule are filaments, which, at an early period, whilst the ovule was open, have penetrated into it; which leads to the probability that—

1. The spiral filaments must regularly penetrate into the ovules; and, 2. They probably contribute to the origin of the developement of the frond upon the ovule, in what way this happens the author knows not, and the details on this point given by Suminiski remain unconfirmed facts.

An important point in this essay is the view the author takes of the whole process of development in this case. He regards it as not analogous to the impregnation in the Phanerogamia, since the essential fact is merely the development of a frond from one cell of the prothallium, which he considers to be merely one of the changes of the 1. It is the first stage, each

The position of the Ferns in a natural system of classification has not been a matter of much difference. Their imperfect organs of reproduction have at once led to their being placed by most botanists among Cryptogamia; nevertheless Bory St.-Vincent elevates Ferns to the rank of a class intermediate between Monocotyledons and Acotyledons, or Cryptogamia; at the same time he rejects the view of Jussieu, who, from the mode of germination of their spores, placed the Ferns among the Monocotyledons. Their relation with the flowering-plants is seen through Cystocaulus, with which order they agree in their gyrate formation and their pinnate leaves. Their affinity with Cryptogamia plants is obvious in the Equisetaceae and Lycopodiaceae.

The order of the Ferns may be divided into the following sub-orders, which Lindley regards as of the rank and value of orders:

1. ORCHIDEAE. The these with a transverse or obliquely transverse complete elastic annulus or ring, bursting vertically. The species are tropical, or extra-tropical only in the southern hemisphere, of a habit simple or variously compound, or generally with conspicuous dichotomous branches and gemmae in the axils; the ultimate branches pinnatifid. None of the genera of this order, as understood by Hooker, are British.
2. POLYGONAE. With the sori dorsal, often near or at the margin, various in form, sometimes constituting an uniform linear or spreading mass, naked or furnished with an involucrum, the these I-celled, with a longitudinal or oblique elastic articulated generally incomplete ring, bursting transversely and irregularly. This is a very extensive sub-order: the species
inhabit almost every part of the world, from the tropics to the arctic and antarctic regions; they are exceedingly variable in size and appearance, including the largest tree-ferns and the smallest herbaceous species. It contains by far the largest number of genera of any of the sub-orders of Pteridophyta. No two of them are alike in form, and have no British representatives, as Cyathæn, Henmiææ, Allophilia, Dicksonia, &c.

3. Osmundaceæ. The thecae have an ovoidicular form, or without one, recticulated, striaed with rays at the apex, bursting lengthwise, and usually externally. The species of this sub-order are not numerous.

IV. Dennlaceæ. The theca sessile, without any ring, concrete into multiocular sub-immersed masses, opening at the apex. This is also a small sub-order, with three genera — Deppea, Zephyropus.

V. Osmoideæ. The theca single, roundish, coriaceous, opaque, without trirgul or cellular reticulation, half 2-valved, with a straight vernation. It embraces the genera Ophioglossum, Hélonostachya, and Botrychium.

The following is an arrangement of the British genera of Ferns —


 Tribe Asplenieæ. The sorus oblong or linear, covered by an indusium opening longitudinally on one side. Genus, Athyrium, Asplenium, Scelopendrium.

 Tribe Osmundaceæ. The sorus elongate, without an indusium. Genus, Osmunda.

 Tribe Adiantarieæ. The theca covered by a marginal or sub-marginal elongated part of the frond, or by a separated portion of the uterus, resembling an indusium. Genus, Blechnum, Pteris, Adiantum.

 Tribe Hymenophyllieæ. The theca opening irregularly; the ring oblique, erect, transverse, complete; the receptacle terminating a vein at the margin of the frond. Genus, Trichomanes, Hymenophyllum.

Sub-Order Osmundaceæ. Tribe Osmundæ. The vernation cincture; the rachis solid. The theca stalked.

Tribe Osmunda. Genus, Osmunda.

Sub-Order Ophioglosseæ. Genus, Ophioglossen, Botrychium.

The Ferns have a wide geographical distribution, the heleophytes often being found towards the north and south poles; whilst the tree-ferns rival the gigantic palms in the forests of tropical climates. It is these last which give a peculiar character to the vegetation of the countries where they grow, as their foliage and stems differ altogether from any that they are able to flower plants. The proportion which they bear to other plants varies much in different parts of the world. In Jamaica they are in the proportion of 1 to 9; in New Guinea as 28 to 128; in New Zealand as 13 to 60; in the Sandwich Islands as 42 to 160; on continents they are less numerous; in equinoctial America 1 to 36; in Australia 1 to 37; in France 1 to 63; in Portugal 1 to 116; in the Greek Archipelago 1 to 257; in Egypt 1 to 971. In the north their parts are shared by them, as they do in Scotland 1 to 31; in Sweden 1 to 35; in Iceland 1 to 18; in Greenland 1 to 10; and the North Cape 1 to 7.

The properties and uses of the Ferns are not in proportion to their numbers in the vegetable kingdom. Many of them deposit starch in their rhizomata, from which food may be prepared. The roots of Nephrolepis exaltata are eaten in Nepal; those of Angiopteris evecta are used in the same manner in the Sandwich Islands. Diplazium exaltata, Cyathæn, Pteris evecta, and Gleichenia dichotoma, all yield starch, and are employed as food in different countries. The Adiantum Capillus Veneris yields astringent and aromatic secretions. Some of the American polypondiums are said to possess medicinal effects, and are used as anti-rheumatic, and purifying remedies. The Angiopteris evecta yields an aromatic oil, which is used in the Sandwich Islands to perfume the fixed oils, as cocacnut oil. The stems of many species contain bitter principles, and have hence been used as tonics. Species of Aspidium and Asplenium have been used in European medicine. The Brazilian negroes form tubes for their pipes from the stems of Mertensia dichotoma. Osmunda regalis had at one time a great reputation in medicine.

FILLANS, James, sculptor, was born at Wilsontown, Lanarkshire, on the 27th of March, 1808. His father having become reduced in circumstances, removed into Renfrewshire where James was yet a child, and the boy was early set to the drudgery of his art. The many advantages which he received from the good working-classes of Glasgow, which also, by the way, has been chiefly the source of the additional facilities that city afforded for improvement in art, as in the expectation of increased patronage. He however met with both, and after a time was in a condition to visit Paris for the purpose of further study. On his return, his success having received a commission for a bust of Mr. Oswald of Auchenincruite, for his tenantry, which led him to visit Italy. Mr. Oswald being then resident on the continent. While still depending upon portrait busts for his means of support, Mr. Fillans was notnegligent of other subjects. His chief work of this class is a life-group in marble, 'The Blind teaching the Blind,' a work of real merit and some originality; it was exhibited in Glasgow, where it produced a great sensation. His 'Boy and Fawn' was considered by many as the most successful production of his class, and his next in order of time established his fame as Sir James Shaw, for the baronet's native town of Kilmarnock, and the bust of John Wilson — both characteristic works, that of Wilson being indeed by far the most striking head of the poet. His classical studies had been received with enthusiasm, and the sculptor was congratulated with two or three public dinners given in his honor. Still, though so far successful, he found his income insufficient to maintain establishments in London and Glasgow, and he resolved to quit the metropolis, his commissions having been chiefly derived from his countrymen. He removed to Glasgow in 1851, but his health, already impaired, became gradually worse; and at length an attack of rheumatic fever caused his death on the 27th of November, 1854. He had long been engaged as long as his strength permitted upon a colossal statue of 'The Fisherwoman of Renfrew,' but left it unfinished.

A life of James Fillans, by James Paterson, was published at Paisley in 1854, in a handsome quarto volume. It contains engravings of his principal works, as well as his designs for Motherwell's tomb, the Burns' series, an elaborate series of designs of 'Tamming the Wild Horse,' and a set of designs illustrative of a tale by a friend. It also contains several illustrations of the city, rivers, and country of Renfrewshire, which would have been as well left in the manuscript, except as evidence of the sculptor's kindheartedness. Fillans used the pencil as well as the chisel, but with so mean equal success.

FINDEN, William, line engraver, was born in 1757. He was apprenticed to Mr. Milian, an engraver of shop-bills, coats of arms, &c., but by devoting his leisure to the study
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of the works of James Heath, and others, he acquired, by his own industry and intelligence, so much facility in the use of the burin, and displayed so cultivated a taste, that after he began to work on his own account he soon found ample employment in engraving book-plates. Among his first successes in this line, his engravings of Smirke’s illustrations of ‘Don Quixote’ have been singled out for special commendation.

Being very industrious, and always remarkable for a certain coolness of line and smoothness of finish, he grew in course of time into a favorite with the publishers, and he was selected to engrave ‘the royal portrait’ by Lawrence, of George IV. seated on the sofa. It was a plate of large size, and for engraving it Mr. Finden received the sum of £150; a sum that was difficult to earn in those days, bestowed upon it the utmost care, and it was so extremely popular that proofs and prints are said to have been advertised for at a large advance of price. But both the picture and the engraving were in an essentially false style of art, and, the fashion having passed away, they have sunk in general estimation even below their proper level. Among Mr. Finden’s other more celebrated large engravings, may be mentioned the ‘Village Festival,’ from the well-known picture by Wilkie, now in the National Gallery, which, with something of the fire of his mind:—firstly, it is inferior to his engraving; and the ‘Highlander’s Return,’ also after Wilkie.

Still his greatest success had been in small plates, especially in book-plates, and the great request in which he was held gradually enabled him to place himself in the inferior hands for the completion of his many engagements. To such an extent did he carry this, that he had at length, in conjunction with a younger brother, Mr. Edward Finden, also a skilful engraver, established a complete manuscript for the printing of the small plates. The effect was, of course, mischievous to art; injurious to his own reputation, as necessarily tending to destroy individuality of style; and eventually it was ruinous to his fortune, by inducing him to undertake—partly no doubt to keep his establishment in full employment, and partly to give himself a share of the profits which he fancied belonged of right to the engraver rather than to the publisher—the publication of various extensive series of engravings. Of these, the first and most various was the popular ‘British Art’ (1808). Oh! for such and such amiable works, and sets of illustrative pictures, with less success; and ultimately by far the best of the whole ‘The Gallery of British Art’—a generally well selected, well-engraved, and characteristic series of engravings from our best painters—on a larger and more costly scale than any of his previous speculations, was undertaken at an unfortunate time, and, being persevered in, in hopes of eventually retrieving the losses, swept away the fruits of all his previous labour.

After this, Mr. Finden’s only important work was a large engraving of his brother’s design, the ‘Dying Dutchman.’ But it was the work of a man broken in spirit, and is a very unsatisfactory production. He completed it shortly before his death, which occurred on the 20th of September, 1843.

FLAGS. [Is. 1.] FLIXW. [Sib. Eran.] FLORIS, an island in the Indian Archipelago, lying between 8° and 9° s. lat., 130° and 132° E. long. Its length is about 200 miles from east to west, and its average breadth about 35 miles. The surface of the island is hilly, particularly on the south side, where there are several high volcanic mountains, from one of which there was an eruption in 1810. Cotton is one of the products. Sandal-wood, bees-wax, handsome ebony, and a hard wood, which has a peculiarity of odor, are also found. The port, Ende, is on the south side of the island; it has an excellent harbour. Laranuku, a town on the east side, on the straits of Laranuku, in 4° 49’ s. lat., 133° E. long., is in the possession of the Portuguese, who have succeeded in bringing many of the natives to the profession of the Roman Catholic faith. This is the only part of the island in possession of Europeans. Ende was formerly subordinate to the Dutch presidency at Coogong in the island of Timor; but in 1818 the Dutch transferred their authority to Ende. The coast is mostly colonised by Biquos and Malays, but the interior is inhabited by aborigines, a dark curvy-headed race, who resemble the Papuas of New Guinea. The island gives name to the genus Floris, which separates it from the islands of Solor and Adan on the east.

FLOWER, that part of a plant in which the organs of reproduction are placed. The flower originates from a bud, and is nothing more than a particular modification in the perfecting of the parts contained in the bud; namely, the several organ parts and internodes. Only two essential processes of development can exist, and from these only two essential organs, as fundamental organs, can be formed in the flower; namely, the stamens and the pistil. The several parts of the flower must therefore be referrible to these fundamental organs, and be traced back to them. Since Goethe’s time this tracing back has been termed the Metamorphosis of Plants. Originally this mode of considering the flower rested upon the observation of cases in which the interruption of the usual processes of development, in some or all parts of the flower, caused those parts to resume forms in which it was not the nature of the fundamental organ from which they had been produced. This latter has been termed Retrogressive Metamorphosis.

As examples of it, we may mention the different monstrosities, the doubling of a flower through the transition of the stamens into petals, the transition of the petals and sepalas into the common leaves of the plant, &c. This mode of establishing the foundations of the doctrine of metamorphosis has however two essential faults: since, in the first place, it seeks to obtain individual facts by means of hypotheses and comparisons; while, secondly, it is based upon accidental and unfavourable circumstances. The only correct and sure ground on which to rest this doctrine is the history of development.

In Phanerogamic Flowers the following parts are distinguished:—

1. The Folia, or the External Calyx (Epioalyx), of which the parts are Leaves (Phylla); the Calyx, the parts of which are Sepals; the Corolla, the separate portions of which are Petals; or, instead of these three, the Perianth (Periannelium), which consists of those separate parts.—

2. The Stamens (Stamiuns), around and within which some stunted accessory follicular organs appear under very various names: and lastly, 3. in the centre of the flower, the Pistil (Pistillum), the separate follicular organs of which are Carpels (Carpelia). In the flower the Sepals are the lower threesepaelti, which is an indeniable circumstance. The upper free part, which is usually covered with papilles, is termed the Stigma, and between these two frequently a stalk-like elongation of the germin occurs, called the Style.

The flower of Phanerogamia is the only physiologically determinate organ of the plant, since it contains the apparatus for the regular propagation. But to this only two parts contribute—namely, the stamens, as generators and receptacles of the pollen; and the seed-bud or ovule, as the plant; namely, the Axis and accessory leaves, and stamens. The innermost part is occupied by organs which are formed from true axial organs, or an intimate blending of these with follicular organs, which are termed the female apparatus or the Leaf. All the internal parts of the flower—namely, the envelopes of the whole perianth, the calyx and corolla, the receptacies containing the seed-bud (the germans, styles, and stigmas), are not, in the Phanerogamia, axial, and they may be absent, without the flower losing its correspondence to the character by which a flower is defined.

In the correct (morphological) view of the flower, there is no distinction between essential and inessential forms, and therefore it is necessarily more proper to divide it into axial and follicular organs. The following relations should be borne in mind:—The axis and its modifications are the basis of the flower, because to them the follicular organs are attached. Attached to the outer part of the axis of the flower occur the several forms of the calyx and corolla, the leafy leaves, and stamens. The innermost part is occupied by organs which are formed from true axial organs, or an intimate blending of these with follicular organs, which are termed the female apparatus or the Leaf. All the internal parts of the flower. At the same time the parts of the flower are usually grouped together and treated generally, according to the relations of number and position, as well as of duration. Thus we obtain this plan for our following investigations:—

A. The Flower as a whole.
B. The number, relative position, and duration of the parts of the flower.
C. The true Foliar Organs of the Flower.
D. The Accessory Foliar Organs.
E. The Rudimentary Fruit.

A. The Pistil.
6. The Spermatophore.

The capsule has been called the male organ of a plant (with the superficious collective term Androecum); the Seed-Buds and their receptacle the Pistil, the female parts (together the Gynoecum). A flower that contains both parts is termed Hermaphrodite (Flies Hermaphrodites). Flowers with the ovaries only are termed Unisexual Flowers (Flores Unisexuales, Diclini). When, in the last case, male and female flowers (mas et femina) appear on the same individual plant, such plant is termed Monoecious (Planta Monoecia); when, in the same case, the individuals the plant is termed Dicous (Planta Dioica).

An Inflorescence which contains both male and female flowers, is also termed Inflorescet Amoronga. Here again it must be distinguished whether the male and female blossoms are formed upon different plans, as in the Capparidaceae (Diclines); or whether, through the suppression of one or other part, a pseudo-dichlinic condition appears in a flower formed on the plan of a hermaphrodite. This latter condition, which is never found to run through all the examples of any species of plant, brings monoeccies and dioecies species into hermaphrodites genera, and suggested to Linnaeus the establishment of his 32d class, Polyanthia, where in one and the same species male, and hermaphrodite flowers are present.

There are very few flowers of so simple a structure that they consist only of one simple essential part, so that no formation of internodes is possible within the flower; and the extremity of the pedicels immediately supports the floral parts. An example of this case in the Euphorbiaceae, where the end of a pedicel bears one single stamen; also in the male flower of the Abietinae, where one single foliar organ, converted into a stamen, constitutes the entire flower. It is also the case in the female flower of Tussa, where the small pedicel, clothed with bracts, terminates immediately in the naked seed-bud. In the generality of flowers however several parts are united which do not stand at equal heights on the axis, and thus more or fewer unites constituting the staminal or carpel structure of the flower. The original condition of the internodes, is here also most frequently permanent; and the pedicel, after the detachment of all the parts of the flower, frequently ends in a small slightly thickened knob, which represents the collective internodes of the flower in an undeveloped condition,—the simple base or receptacle of the flower (Torus). Examples in which individual internodes become elongated are rather rare. In some families they are elongated between the inner floral envelopes and the stamens (Androphorum), and in others between the flowers and the receptacle. The latter is generally termed Germin Stipitatum. There are examples of both in the Passifloraceae and the Capparidaceae.

A flower exceedingly longer part, without elongation of the individual internodes, frequently occurs as a gynophore in flowers which contain many germs (as in the Rosaceae, the Ranunculaceae, Magnolaceae, &c.) Again the gynophore is often presented as a hemispherical or cushion-like part, as in some other Rosaceae and Ranunculaceae. A very rare form of it is that of a reversed cone, which bears the germs upon a base turned upward, as in the Notobium. In the rarest instances, with the exception of this case, the axis of the flower is elongated within the floral parts even without ending as a germ; but this does sometimes occur, as in the male flowers of some Palms and other plants; for example Chamaedorea, where the points of the petals unite with the apex of the axis of the flower which passes up through them. In very crowded inflorescences, the torus of an axillary bud develops obliquely, and rises up on one side, especially beneath the germs, so as to appear as a part of its side-wall; this happens with most of the Grasses. A similar circumstance arising from a similar case, happens when many single germs arise only from one kind of the divisions of the torus, which forms the basis of each of those germs, and thus assumes the appearance of forming a part of the wall of the germ (as in Petautogonum and Dryadaceae).

Every other similar expansion of the internodes of the flowery bud immediate bear seed-buds, is called the Disc (Discus). This may be situated beneath the rudiment of the fruit (Discus Hypogynus), and then may be flat, as in Potentilla and Fragaria; or cup-shaped, as in Rosa, Populus (mas), &c. This latter may be free (Rosas), or may be united to the base of the stem (Discus Epigynus, etc.). It may pass off from the middle of the (half-)inferior germ (Discus Perigynus), as in many Myrtaceae; or, lastly, it may rise above the (inferior) germ, and stand upon it (Discus Epigynus). Here it is very rarely (or never) flat, but funnel-shaped (Discus Aglaé). It is sometimes termed the Germination or Germentus; or resembling a style, as in the Orchidaceae and Aristolochiaceae. In all these cases the foliar organs of the flower may be situated in very different places. Usually, indeed, they collectively form a zone around the edge of the disc; and when this disc is divided it may correspond to as many discs lying one above another as there are internodes implied by the number of foliar organs. Frequently the true foliar organs stand around the edge of the disc; and upon its inner surface the germs are arranged in one or more circles (as in Rosa, Panic., Oenagraceae). More rarely the floral envelopes alone stand on the border, while the stamens are then at a distance from them, upon an internal prolongation of the disc, as in the Orchidaceae.

The disc is by no means always regularly developed, but sometimes enlarged at one side only, whereby the whole flower appears oblique, thus in Rosaceae. The most remarkable structure is in Pelargonium, where the disc forms a shaving or leaf-like prolongation of the receptacle, in Tropaeolum, where the spur is formed solely by the disc.

There are but few special observations to be made respecting the structure of the internodes of the flower; it is in general like that of annual stems; and seems to be formed from a system of vascular bundles, and these of simpler development. The internodes (as also some of the foliar organs) within the flower, frequently do not have the epidermis developed, but, instead of this, a delicate soft and transparent integument exists, and, often containing a saccharine secretion, forms the investment of the surface (Nectarinn).

It is very rarely that a flower consists of one part only, as in the male flowers of Euphorbia, Leuca, and Wolffia, which are formed of one foliar organ, the author; or the female flower of Tussa, which is formed of one axial organ, the seed-bud. Usually more parts unite to form a flower: thus the female flower of most of the Araceae consists of one or more spiral foliar organs (a carpel surrounding the flower); the flower of the Salicaceae consists of a scale-like disc and some stamens. In the generality of cases, both male and female organs are present in the same flower: they are seldom naked, as in Hippuris, but usually surrounded by floral envelopes.

In axillary flowers, those parts which are turned towards the peduncle are termed the upper, and those turned towards the bract, where it is present, the lower. Some plants exhibit the peculiarity that the pedicel, until the time of the blooming, makes a half turn (analogously to the (male) stem), and it may be the true pedicel, as in Calcolorinia and some Orchidaceae; or the inferior germ, as in most of the Orchidaceae. By this curve, the upper parts of such a flower (in those plants the lip) become apparently the underside of each flower, and such flowers are termed Flores Aspersissimae. The term is sometimes falsely applied to some Orchidaceae in which no such twisting takes place, but in which the lip stands regularly as the upper part of the flower, as, for example, in Bletigia.

The individual organs of the flower taken generally, according to the common view, and known by collective names, may originally consist either of one piece or of more than one: in the first case they are parties monomers; in the second case parties diemer, triemer, or polymers. In either case the parts may be entirely separated and independent of one another, or they may be grown together in various ways. These coherent sets were formerly also called parties monomers, or monomers; later, diomers, triomers, or polyomers; and, as for example, Hemerocallis parthenium gamo- (mono-) phylum, hexamerum; Salvia, corolla gamo- (mono-) petals, pentamers; Rosa, corolla pentapetals, &c.

The coherence occurs here in the same manner as in the stem-leaves, but on account of the crowded position in the flower-bud, much more frequently. It happens either that
a single foliar organ grows together by its edges into a tubular or cup-like organ, as, for example, occurs frequently in the so-called monomeric floral envelope (Bracteole); or that several foliar organs grow together by their edges: this commonly affects all the edges of a circle of leaves, but sometimes two edges remain united, as with the calyx of Centaurea lutea. So, again, this process is usually simultaneous in development at all the edges of a circle; but it sometimes happens very much later,—a, on two uppermost leaves, that is, in one in which the petals and stamens are in the corolla of Torenia and the florets ligulati of the Composite; or, b, with each pair of leaf-edges at the side of the leaf-circle, whereby the two-tipped forms (petals bilabiata) of descriptive botanical arise. Another kind of blending also occurs in the twelfth leaves, which is an aggregation, or a double or a single calyx of Monocotyledons, Diadelphous, Polyadelphous. When the foliar organs of the flower are coherent, the blended part is termed the Tube (Tuba Perianthii, Calycis, Corollae, &c.); the free part is termed the Receptacle, or Vesica (Faux). One of the most striking examples of coherence, which also has no analogue in the stem-leaves, is found in the blending of the foliar organs of the flower at the point only, the union never extending further; so that the foliar organs, which are united at the base, are separate in the corolla of the male flowers of Chamaedorea, Canarina, and in the androspore of Symphyomena montanum (I).

Abortion in the flower means that some part present in the rudimentary condition is arrested during the development and growth up to a certain stage. It is not uncommon to come by observation. There is no other kind of abortion. So soon as the individual parts of a flower become distinct members, the foliar organs appear arranged around an ideal and real axis of the flower (the axis of the flower), and in the rudimentary condition always regularly. Through subsequent unequal development of the single parts, the flower frequently becomes unsymmetrical, or, as it is called, irregular. This irregularity is always such that the upper part of a flower becomes developed differently from the lower part, but the regularity very seldom affects the germ, which almost universally remains regular even in unsymmetrical flowers; yet there are cases in which this is the only symmetrical part, as in many of the Boraginaceae, Datura, and Caryocaraceae. In this classification, the coherence of its parts, is divided into two halves, an upper and under, developed in different ways, they are generally termed bilabiate; but if only one single foliar organ is developed this is relatively rarer; the corollas and innermost circles have usually fewer members. Again, respecting the number of circles which follow one another, no general state-ment of importance can be given. Seven different forms of foliar organs may possibly exist in the same flower, namely, the epicalyx, calyx, corolla, accessory corolla, the stamens, accessory stamens, and the carpels; but there is no flower in which all occur in conjunction. All these foliar organs may be present in one or more circles, with the exception of the epicalyx, in which there is no example of a double circle. Perianth, calyx, corolla, accessory corolla, and carpels occur in one, or more, or rarely in two circles. Stamens may be present, or, three, or possibly even four circles; more circles than this have not been exhibited in the flower. If the number is increased, which seldom happens except in stamens and carpels, as in Ranunculaceae and Dipsacaceae, the Magnoliaceae, &c., they stand no longer in groups, but in succession, with the exception of the perfect individualized flowers, with the single exception of some Scitamineae, five trimerous circles of foliar organs of the flower appear to be formed in those where a second circle of petals exists. The greatest multiplicity of forms occurs in the dicotyledonous plants. Lavoere, for example, has an epicalyx, calyx, corolla, stamens, and carpels in five circles, with increasing numbers of members; those of the calyx and corolla alone are equal. Gnadia vivens has perianth, stamens, accessory stamens, and carpels, but in eight circles, and in each circle there is an increase, both by no means necessary that all the parts of a circle of floral foliar organs should be ultimately developed in the same manner; and many floral structures which have hitherto appeared more or less mysterious, by discussing this truth in mind and following on the history of the development, be readily traced back to the original type.

The duration of the individual parts of the flower is very various; the axial organs, so far as they support the rudiment of the fruit, are permanent. While the flower is in full growth, and then to the ripening of the seed, then fall away with it; or if becomes disengaged from them, die away with the remainder of the plant. When axes bear only male organs, or flowers, their duration is different; sometimes they are cast off at a certain height, but generally they remain upon the parent plant, and gradually die away. The foliar organs of the flower are equally various in their duration. Perianth, corolla, and accessory corolla commonly perish soon after the perfecting of the flower; either they are cast off by true disarticulation, or they wither upon the parent plant. The epicalyx and the calyx frequently share the fate of the axial organs supporting the rudiments of the fruit; the carpels almost invariably. The carpels are rarely destroyed before the perfection of the flower; either they are cast off by true disarticulation, or they wither upon the parent plant. Robert Brown in Psalidotes Theta. The stamens die away almost immediately after the dispersion of the pollen; either they are cast off, or they dry up and die away within the flower.

The terminology in use is as follows:—Those parts which fall away immediately, when their perfect formation is but scarcely completed, are termed caducous or fugacious (partes caducae); those which endure somewhat longer are termed, when they are cast off, or deciduous (partes deciduae): if they retain their position, and die by gradual withering and drying up, marcescent (partes marcescentes); those parts which remain long, still vegetating, are termed persistent (partes persistentes); if they change their forms further growth they are termed exsert scent (partes exsertae).

As among the floral envelopes are usually reckoned the perianth, the calyx, and the corolla, we may also include here the epicalyx. Under the term perianth, in its narrowest sense, only the coverings of the flower persist after the ovum number, are applied closely to the flower and upon one level; so that all individual foliar organs on the axis of the flower, which only inclose stamens or germen, may be termed bract. All these bracts have this in common, that they are merely foliar organs peculiarly modified; and consequently all the peculiarities of form which occur in the latter naturally appear in the former also. It is not often that the leaves of the floral envelopes have great thickness; they are the most altered in form, the most useless. They answer to the petioles or peduncles are here frequent, much more so than in the case with the stem-leaves; and these are termed, according to their various resemblances to objects, cup-shaped, as in the lower petal of Pelopoda; hooded, as in the upper leaf of the perianth of Acetum; chaffy, as in so on. If a long sac-like appendage is formed at the basis of a perian-thal leaf expanded above, it is called a spur (calcar), as in
The formation of the spur is frequently conjoined with the formation of a symmetrical flower, where one upper or lower foliar organ forms a spur. The flattened expanded form, which is connected with the axis by a linear prolongation, frequently occurs in the sepals (t). This expanded surface is termed the limb or blade of the leaf (lamina); the narrowed base is not termed pediole but claw (unguis). True articulation is frequent between the base of the spur and the foliar organ. It generally occurs in the continuity of these leaves (t); therefore there are no true compound perianthial leaves, though a simply divided limb is frequent, as the petals palmitatiflora in *Ranunculus*, the petals pinnatifida in *Solanum*, and *Fuchsia*; it may probably be afforded in the separation of the upper part of the tube of the flower in *Mirtalobis*, of the calyx of the *Datura* from the lower, and in some similar cases.

True calyces are not met with in the floral envelopes, but appendages analogous to the ligula appear, which indeed a part of the structure described as the corona belongs. As in the *Narcissus* and the *Lycoris*, the scales of the throat of the *Boraginaceae* also belong here. These parts are formed in variously refined forms on the floral envelopes, and such appendages are sometimes exhibited standing upon the surface of the foliar organs, in three or more rows, one above another. Almost all parts recognized as corona and accessory corolla (paracorrina) belong here, in particular a part of the elegant form exhibited by the *Diascia*; so also does a portion of the so-called nectaris, as, for example, in the petals of *Ranunculus*. All these are more or less dependent appendages of the foliar organs, which are developed on the spur, so flat, all, or at least a portion of, being produced from them subsequently. Here also occurs the one-sided development of a corolla, this is seen in the petals of the *Apoxyopsis* (Vinca, Narium, and Cebora) the collective form of one or more circles, whether eother with one or other, or, in a more accurately designated, according to further peculiarities, as tubular (tubulosis), bell-shaped (campanulatum), funnel-shaped (infundibuliformes), salver-shaped (hypocrateriforme), rotate (rotatum), &c.

Five kinds of floral envelopes are easy to distinguish. When simple floral envelopes are either solitary or nearly similar developed in a circle of one evident form, colour, and structure, they are described under the general name of perianth, the single organs of which are called perianthial leaves. If in the floral envelopes of one flower we can distinguish two circles differing in form, colour, and structure, the outer is named the calyx, its component organs being sepals; while the inner is termed the corolla, its single parts petals. Then if three circles of forms are distinguishable the outermost is called the calyx, the middle of which is the corona, and the innermost phylla. When between the simple or multiform floral envelopes and the stamens other independent foliar organs occur which exhibit a structure very imperfect and abnormal compared with the envelopes, these are called a pammorphan corolla, of which it will be the object to speak further on, among the accessory parts of the flower.

The Perianth consists, according to the preceding considerations, of one or more circles of leaves, which are developed so as to be similar in colour, form, and structure. The following series of its forms may be more minutely characterized—

* The individual foliar organs are always expanded in a flattened form, seldom divided into limb and claw, and, at least occasionally, present a coherent, prominent, nutate, or ovate shape. They may be green, as in the male flower of *Urticaceae*, or of various colours, as in *Thymelaeae*; they may be firm and solid, and that especially when green, as in *Boraginaceae*; or of delicate texture, as in *Aristotylaceae*; or they may be developed as delicate filaments, or the innermost of which is very thin, as in the *Typhaceae* and *Canarium*. The perianth is almost universally regular, rarely (in some *Ranunculaceae* and *Orchidaceae*) symmetrical; in these cases never (t) 3 to 5 petals, or sometimes 10, and in *Diascia* it is then not unfrequently developed, hollow (concinnatum in *Acousmum*, calcaratum in *Orchidaceae*), and it is commonly the uppermost part of the leaf. The perianthic portions may be, as in *Solanaceae*; or coherent, as in *Fuchsia*, *Hemerocallaceae*; or the petals, as in *Urticaceae*; or of more, as in *Liaceae*. The petals are frequently blended with the stamens; in the coherent perianth the tube is sometimes straight, as in *Narcissus*; sometimes curved, as in *Aristolochia*. The mouth is mostly notched; sometimes, but seldom, as is the case in *Narcissus*, furnished with appendages which form a corona, which however are rare in the perianth, and in free foliar organs only (t) occur on the lip; the inner circle often has a beard.

The structure of Perianthial Leaves, is, on the whole, that of very simple leaves, which exhibit no special peculiarities, particularly if they are green. The ramifications of the vascular bundles are therefore simple, but an intercellular cavity occurs in the epidermis, usually. In the colored and delicate parts the cells of the parenchyma contain colouring matter. In general the parenchyma is very loose and almost spongy, often filled with various contents, and large intercellular cavities filled with air; hence the white colour. The epidermis is less developed in coloured leaves, and more resembles the structure of epithelium; stomata are sometimes present, especially upon the under surface, but the epidermal cells of the upper surface are all shorter or longer papille, which give the upper surface a peculiar velvety-like appearance. It is very frequent here to find the secreted layer of the epidermis (cuticle) regularly and delicately striated (stellulatum), which certainly contributes to heighten the brilliancy of the colour, and perhaps, by its effect upon the rays of light, to the production and modification of the peculiar tints.

Occasionally, especially at the base of hollow parts, no perianth is developed, but the leaf itself assumes a peculiar structure, to perform the function of secretion of a juice containing much sugar; as, for instance, the nectary at the base of the perianthial leaves of *Fritillaria*, very various parts on the labellum of the *Orchidaceae*, c. c. In these cases the differentiation of the stamens and carpels is not infrequently apparent in the intercession of many thickened porous parenchymatous cells, as in the species of *Bankia* and *Dyandra* (t). In paleaees perianthia the spiral and other vessels are not found in the usually simple vascular bundles, and in hairy perianthia even the vascular bundles themselves are wanting.

The Calyx only exists when a corolla occurs with it; it therefore can never be confounded with it. It is always the external of two dissimilar sets of envelopes. It is a series of perianthial leaves, often (in the *Boraginaceae*) it is not so frequently delicate in structure and colour, as in the *Scitamineae*, *Muscaceae*, *Butomaceae*, *Ranunculaceae*, *Tro- paeeae*, &c. Usually it consists of one circle of sepals, more rarely of two (as in the *Ranunculaceae*). These sepals are always very simple, oval, or lanceolate, seldom pinnatifid, very frequently broad at the base and tapering to a point, or very small (dentes calycis obsolete); sometimes they appear only as dry scales, or as tufts of hair (the pappus of the *Compositae*); sometimes they are androecious; in other cases they are frequently of hollow or concave form. The number of the sepals in each circle is in *Monocotyledons*, frequently three, more rarely four or two; in the *Dicotyledons* it is most frequently five, but also two, three, or four, and perhaps more in a certain number of cases. The number of the petals may occur in every way, but never with the corolla and stamens nor with the genems; that which is so called being quite another condition. Both in free and in coherent sepals, regularity and symmetry are met with; the latter often exhibit the bilabiate structures.

That which has been said of the structure of the perianth applies also to the calyx, only that here green foliaceous sepals are the more frequent.

The Calyx, as the inner set of floral envelopes accompanying a calyx, may be compared to a very delicate and colored perianth. No true corolla occurs perfectly green and resembling the leaves; its series of forms is greater than that of any other of the floral envelopes. In the *Ranunculaceae* it is composed of three, or four, or five, or perhaps more. The development of the sepal complex of the *sedalia* may occur in every way, but never with the corolla and stamens nor with the genems; that which is so called being quite another condition. Both in free and in coherent sepals, regularity and symmetry are met with; the latter often exhibit the bilabiate structures.

The individual petals exhibit, on a reduced scale and in a delicate condition, almost every variety of form of the leaf, with the exception of the truly compound. Concave forms are here frequent, such as the hood-shaped, petcher-shaped, and bell-shaped petals. Furthermore, there are to be found petals of an otherwise regular corolla, as in *Fritillaria*. Fringed and feathered forms, as well as variously lobed petals, are also by no means rare. The limb and the claw are often clearly to be distinguished. Parts analogous to...
the ligules, and every imaginable form of appendage, with the exception only of the stipules, occur frequently, and characterize genera and families.

On this account indispensible to distinguish the simple appendages of the petals from the independent foliar organs. To the former belong the scales (formulae) of the Boraginaceae, the scales of the corona of the Stellaria, the formations generally described as corons in the Scrophulariaceae and Polemoniaceae, the nectarias of Rorippa, Papaver, &c.

The corolla consists of one circle, rarely of two (three series in Berberis), or more (four series in Nymphaceae). In Monocotyledons the number of members is equal to those of the calyx, or to a multiple of it. In such cases the corolla is disposed symmetrically, but it is sometimes composed of two, or four, or of a greater number in Drysta. The number of members is equal to that of the calyx, or greater; very rarely indeed it is smaller; this last case occurs with Hibiscus. Supercorolla is not infrequent, and sometimes involves all the foliar organs of a corolla at once, as in the summer flowers of many species of Viola, Lepidium ruderale, and in some species of Acor. The coherence of organs in every way is still more frequent; never indeed with the case usually organized.

The corolla, whether with free or with coherent petals, may be regular or only symmetrical. In the latter the bilabiata formation is the most frequent, especially in five-flored species, in such cases the tube or throat of the petal is at the side, or under the side of the flower, the upper lip consists of three or of two petals. In the latter case these two are very often little or not at all coherent, as in Teucrium, the so-called radiated flowers of the Compositae (as in Helianthus); the true bilabiata or mouth-like corollas (corolla ringens), in which the petals form the upper lip often present a concave form overhanging the lower lip, termed gales; as in Calliopsis. In the former case the corolla is termed the standard (vexillum), whilst the lateral petals, as wings (alæ), are usually dissimilarly developed, and the two undermost, very frequently coherent, also developed unequally at the two sides, approach each other in a concave form, as so to form the keel (carina). Sometimes all the petals of the papilionaceous flowers become coherent at the lower part, and form a tube, as in Trifolium; or individual petals are abortive, &c. The most irregular of all the forms have received no name, and are all such as appear for instance in the Polygalaceae, the Basellinaeae, Tropaeolaceae, &c.

All that was said respecting the structure of the perianth holds also for the structure of the corolla, remembering only that this is more delicate. The corolla of the fives is very much in contrasting matter, and their distribution in genera is sometimes very remarkable. Very dense texture, in consequence of the presence of much-thickened porous cells, as in the Amaranthaceae, is infrequent. The structure of the epidermis, and its development into papille, hairs, &c. is very manifold. Development into surfaces secreting nectar, both at the bottom of concave forms and upon the appendages, is especially common. The petals also occasionally secrete a viscous substance, in consequence of which they appear of a milky white appearance. This happens at the points of the inner petals of the Pumariaeae.

The Epicalyx is seen where three separate series of foliar organs are distinguishable in the floral envelopes, and it is the outermost of these. There are not many plants which exhibit this series, and such appear for instance in the Polygalaceae, the Basellinaeae, Tropaeolaceae, &c. For an account of the other organs of the flower, see STAMENS, FRUIT, S. 2; STOMATA, SEED. For the functions of the flower, see REPRODUCTION IN PLANTS AND ANIMALS, S. 4.

(Schleiden, Principles of Scientific Botany.)

FOOD. The materials taken into the system of organised beings, and by which their functions are maintained, and out of which their bodies are formed, are called Food. Food in its widest sense is the raw material out of which plants and animals are manufactured. We shall confine ourselves here to the consideration of the food of animals, and of man in particular.

The great cause of the necessity of a constant supply of new matter or food to the body is the waste of the materials of which the blood and organs are composed, during the performance of their functions. The waste of this waste is seen in the form of the various excretions which are thrown off from the body by the skin, liver, kidneys, and bowels. We shall then, that the food, the blood, and the excretions, represent each other, that they contain substances of the same nature, and are all composed of the same ultimate elements.

If we take a portion of human flesh or blood, and seek for its ultimate elements, we shall find, that, on accurate analysis, they will yield the following elements:—


Few or none of these elements occur in the human body in their pure form, but are combined variously with one another, forming very different physical properties and chemical relations. These organic compounds may be divided, for physiological purposes, into two classes: the first four, carbon, hydrogen, oxygen, and nitrogen, being called organic, whilst the remainder are called inorganic elements. The first four are found universally present in plants and animals, and because animal cell and no vegetable cell can grow unless the whole of these elements exist. Hence, as they lie at the foundation of all organic existence, they are properly designated by this term.

The inorganic elements, though very generally present in large classes of animals and plants, are not universal. Man requires phosphorus and calcium in the form of phosphates of lime; for his teeth and bones, and the bones of the lower animals contain no phosphate of lime. Sea-animals and plants will not live without chlorine and sodium in the form of common salt; but fresh-water plants, and plants away from the sea-shore, do not require this constituent. The term inorganic, then, is applied to these elements to express their different relation to plants and animals, and will also point out their frequent occurrence in the mineral world. The elements of man's body however are all derived from the mineral world, and are identical with the same bodies in inorganic substances. The carbon found in the vegetable body is identical with that which forms, in its pure state, the diamond—which enters into the composition of graphite and various kinds of coal, and is found in limestone and chalk, forming a part of the limestone rock; and which, in the form of carbonic acid, is evolved by the burning of coal, of which these rocks are composed. The hydrogen of the human body is the same as the gas which, united with oxygen, forms water, and when combined with nitrogen produces ammonia. The oxygen of the animal is identical with the gas which, with nitrogen, forms as a fifth part of the atmosphere, and which, combined with the metals, forms oxides, of which the greater portion of the earth's surface is composed. The nitrogen of the organic world is identical with that which constitutes so large a portion of the atmosphere. Nor are these elements alone which constitute the human body in common with the animal and vegetable world, but they possess the same chemical properties, and that their agency in the human body depends on these properties. Thus, carbon and hydrogen are inflammable bodies, and have a great affinity for oxygen, with which they unite, forming carbonic acid gas: and water, the heat of combustion being given off in the process of union. This very process goes on in the animal body, and constitutes one of the most important functions of the body. The characteristic features of the functions and properties of animal and vegetable life depend on the chemical relations of the four organic elements.

These elements never enter the system in their pure form. Carbon, however needed in the animal frame, cannot be appropriated pure; and a man would starve with the Koh-i-Noor diamond. Plant food, therefore, cannot be used to advantage for more digestible forms of carbon. The gases hydrogen, oxygen, and nitrogen, would, any one of them in their pure state, destroy human life; and even when the two last are...
mixed with the atmosphere, they will not support life in that form. Again, we may mix them in various ways, and not be mistaken, for example, when combining with oxygen to form carbonic acid, and hydrogen combines with nitrogen to form ammonia, and these two compounds unite together to form common smelling-salts, or carbonate of ammonia. But small variations in the way in which they contain all the organic elements, will not serve for human food. Nevertheless what is not food for man is nutriment for plants. Carbonic acid and ammonia supply plants with materials of growth. It is from these two bodies that the vegetable kingdom elaborates all the substances which give to plants elegance in form, beauty of colour, deliciousness of scent, deadliness as poisons, and nutritionness as food. The plant stands between the mineral and animal kingdoms, preparing the former for the service of the latter. Without plants there could be no animals. This is one of nature's statements, and we are presented with no instance of an animal existing directly on mineral matter. It is true that many animals are carnivorous, and live on the flesh of lower animals. The lion and the tiger prey upon the deer and the antelope; but if we go one step further we still arrive at the vegetable kingdom as the source of animal nutrition. The deer and the antelope are herbivorous creatures, and the flesh of their body is formed directly from the plants they eat. So with the animals eaten by man, which are of that vegetable class, and supplied to man the materials they have obtained from the vegetable kingdom. At the same time the best standard we can take of food is milk, which is derived from the animal. When human milk is examined, it gives the following results in every 1000 parts:

<table>
<thead>
<tr>
<th>Component</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>870</td>
</tr>
<tr>
<td>Butter</td>
<td>63</td>
</tr>
<tr>
<td>Sugar</td>
<td>10</td>
</tr>
<tr>
<td>Casein</td>
<td>5</td>
</tr>
<tr>
<td>Salts</td>
<td>5</td>
</tr>
</tbody>
</table>

These five constituents of milk may be regarded as typical of all kinds of food, whether obtained from the animal or vegetable kingdom. Hence we may class alimentary substances according as they are represented by one or other of these constituents of milk.

1. Aqueous. Water is required not only as the medium of conveying the other substances into the body, but it forms a permanent constituent of the body itself. Blood contains 790 parts of water to 210 parts of solid matter in every 1000. Muscles contain 770 parts of water to 230 parts of solid ingredients. The brain and bones contain about 937 parts of water in 1000. If food does not contain water naturally, it is taken into the system in the form of tea, coffee, beer, and also in its pure state. The quantity of water taken with the food should be about in the proportion of four to one, as we find it in milk. We cannot, however, judge of the quantity contained in solid food till we know its composition. Thus many substances which appear solid contain large quantities of water. In potatoes, for instance, there are 75 parts of water in every 100.

2. Oliginaceous. The butter of the milk represents oily and fatty matters in general, which seem to enter into the composition of all healthy food. They are taken by the inhabitants of tropical countries in the seed of the cocoa-nut, as well as by those of the polar regions from the fat of the seal and many kinds of fish. They are obtained from both the animal and vegetable kingdoms, being known by the name of suets, fats, and lard, from the former source, and oils and tallow from the latter.

3. Saccharina. The sugar of the milk represents several substances obtained from plants and used as food. Sugar itself varies in its composition according to its source; hence we have cane-sugar, grape-sugar, maple-sugar, &c. Sugar has also a composition near approaching that of starch, and this substance is very generally found in the vegetable diet of man; pure in the form of arrow-root, tapioca, and sago; combined in the flour of wheat and other cereals; in the eggs of animals; and the products of food, sugar is found alone in milk.

4. Proteinaceous. The casein of the milk, which, when separated, is known by the name of cheese, has in common with the other vegetable and animal substances, called fibrine and albumin, a certain basis name Protein. These substances form the chief part of the fabric of the body, and in their capacity of food perform a very different function in the body to the butter and sugar before mentioned.

5. Inorganic. The salts of milk are the saline substances which, entering into the composition of various parts of the human body, are necessary to its integrity and health. The importance of the presence of these substances is frequently overlooked in medicine, many diseases of the human frame arising from their absence. They are conveyed into the system in both animal and vegetable food; but in common salt we have an instance of a substance belonging to this class taken directly from the mineral kingdom as food without the intervention of the vegetable kingdom. In addition to these forms of dietetic substances found in milk, the food of the adult human being constantly contains certain principles which do not appear to be represented in the system. Thus, the substances called condiments, as the salt of the earth and wholesome spices, which although not essential to the diet of man, seem to exert a very beneficial influence when taken into the system. In tea and coffee there is a principle called theine, which seems to be the active ingredient of these substances. In the fruit of plants also, we have acids, as the citric, tartaric, malic, and oxalic acids, which seem to act very beneficially in certain states of the system. As these substances seem to act medicinally rather than dietetically, they may be properly called, as a class, the inorganic constituents of food. The following classification will give an idea of the kinds of food:

Class I. Alimentary Substances.

Group A. Aqueous, containing water as a principal ingredient.

Examples:—Tea, coffee, beer, wine.

Group B. Carbonaceous, containing carbon as a distinguishing ingredient.

1. Saccharina. Examples:—Sugar, starch, cellulose.

2. Oliginaceous. Examples:—Oil, butter, fat.

Group C. Nitrogenous, containing nitrogen as a distinguishing feature.

1. Vegetable. Examples:—Flour, oatmeal, maize.


Group D. Inorganic.

1. From organic sources. Examples:—Potash in fresh vegetables, phosphates of lime in flour and flesh.

2. From the mineral kingdom. Example:—Common salt.

Class II. Medicinal Substances.

Group A. Acida. Examples:—Citric acid in oranges, tartaric acid in grapes, oxalic acid in rhubarb-leaves.

Group B. Volutile Oils. Examples:—Mustard, pepper, nutmeg, cloves.

Group C. Alkaloids. Examples:—Theine in tea and coffee, thebromine in chocolate.

We shall here make a few general remarks on the nature of the substances in the groups indicated, referring for special information on the plants and animals yielding food to the supplements referred to these subjects throughout the Cyclopaedia, and its Supplements.

Under the head of Water we shall find an account of Water and the substances it usually holds in solution. In taking it as an article of diet, the following general remarks should be borne in mind:

First, it may be taken in too large quantities to be carried off by the other excretory organs, and then it remains in the system to impoverish the blood, and to reduce the amount of solid matter that is necessary for the performance of the functions of the tissues of the body. This is one of the results that take place from what is called the 'water cure.' Unless persons have sufficient vigour to take the exercise necessary to throw off by the skin the water that is taken into the system, it will effect necessity arise. The good that is effected by this system on the treatment of certain diseases must be attributed more to the exercise it renders necessary than to the unnatural quantities of water taken into the system.

Secondly, water may not be taken in sufficient quantities to carry on the healthy functions of the system. If the food is taken too dry, it is only imperfectly digested, and many important constituents, such as the salts, are not taken into the body in sufficient quantity. A deficient quantity of water in the blood will also prevent the healthy action of the kidneys, and waste and degeneration of the solid parts of the body.
high temperature a gelatinous mass, explains the change which takes place in boiling the flour of the grains in which it is contained.

Starch is found in some plants in greater quantities than in others; it is very generally found in perennial roots and rootstocks, in the stems and in the seeds of plants. There are few or no vegetables or parts of plants that are eaten that do not contain starch. It is found in turnips, carrots, potatoes, cabbages, parsnips, beans, peas, wheat, barley, oats, and the tubers of Commelina, lilies, herbs, mint, haxl-mint, and all other seeds; in the apple, the pear, the plum, and cherry, and all other fruits. In many of these things however it is not the distinguishing alimentary ingre-dient, but it is a component part, and only as such is starch considered as an article of diet. The substances in which it occurs pure are arrow-root, sago, and tapioca.

What is sold under the name of arrow-root in the shops, is a form of starch procured from the rootstocks of various species of plants belonging to the family Marzamaceae. The three kinds of arrow-root known in the shops, the West Indian and the East Indian arrow-roots, and Tons les Mois.

Although there is much difference in the price of arrow-root, its composition is always the same. Even the substances used to adulterate arrow-root, such as starch, and sago starch, are of the same composition; and though the appearance and flavour of the arrow-root may be impaired, its ultimate dietetical action is the same.

Although tapioca and potato starch, are all composed of the same constituent, their flavour is very different; hence the preference given to arrow-root as an article of diet. This flavour depends on some peculiar prin-ciple which is produced in the plant from which the starch is derived, and is conducive to the health. It is not found in the rid of Arrow-root is used for making cakes, puddings, and a thick gelatinous fluid in great request in the sick room. It is a property of starch to combine with water at a tempera-ture of 100° and form a gelatinous compound. This pro-perty of starch renders it very useful in cookery, and seems to increase the digestibility of the starch itself.

Arrow-root is frequently regarded as nutritious; but it will be seen that it is not nutritious in the proper sense of the word. These foods can alone be called nutritious which contribute to the building up of the fabric of the body by adding those materials to the tissues which are being con-stantly removed by the wear of the body. Now starch does not perform this function, and is entirely consumed in the body in maintaining its animal heat. Arrow-root however and the other forms of starch, are frequently mixed with nutritive matters, such as milk and bread; and in this way the food into which they enter becomes nutritious.

Sago is the other and another kind of starch obtained from the inside of the trunks of palms, and other trees. Many plants yield starch in their stems, which, on being prepared, is called sago by Europeans. The sago which is sold in the shops of England is principally imported from the islands of the East Indian archipelego. These foods can alone be called nutritious which contribute to the building up of the fabric of the body by adding those materials to the tissues which are being con-stantly removed by the wear of the body. Now starch does not perform this function, and is entirely consumed in the body in maintaining its animal heat. Arrow-root however and the other forms of starch, are frequently mixed with nutritive matters, such as milk and bread; and in this way the food into which they enter becomes nutritious.

Sago is not generally so carefully prepared as arrow-root, and it is a much cheaper article of diet. Its ultimate action is perfectly the same as arrow-root. It is now often employed by starch-makers to procure the finer kinds of starch. When thus prepared, it is used to adulterate arrow-root.

Tapioca is another form of starch. It is brought to Europe from South America, and is the produce of a plant known to botanists by the name of Manihot Eschsch. It is poisonous in other forms, and is converted into a starch by extracting a poison from it, which they use to poison their arrows, before they obtain the starch. Cassava, which is eaten by the natives, is procured from the same plant, but is prepared in a very different way. It is converted into a starch by a process which is different in chemical composition from that of sago and arrow-root, and it is used in the same way, and for the same purposes.

There are many other well-known plants which owe their dietaetical properties to the starch they contain; amongst these we may instance the potato, the cabbage, the turnip, the parsnip, the carrot, the radish, the salsify, the chicory, the Jerusalem artichoke. From any of these starch might be prepared. The roots of Arum maculatum, though acrid, contain much starch. When cooked, the seridity of the plant is got rid of, and they are
eaten with impunity. These roots are employed in making the substance called Portland sago, which is the starch separated from the rest of the matter of the plant. This sago is used for the same purposes as the other kinds of sago.

The roots of Orchis mascula, which is a common plant of our meadows, form the substance called sable. When it is boiled, it forms an agreeable article of diet, which, before the introduction of tea and coffee, was very generally used in this country. It is now almost entirely dispensed with in Great Britain.

Starch differs in some of its chemical and physical properties according to the plants whence it is obtained. In this country, the Starch of the Artichoke (Helianthus), which is fed on by the hares, is a form of starch obtained from the Inula Helianthium, a plant not uncommon in our own fields. Lichen-starch is another form, which is found in almost all kinds of Algae as well as Lichens. This starch has the same power of thickening water at a high temperature as potato-starch and tapioca; and hence, when any of these plants are boiled in water, they form a thick mucilaginous decoction. - The thickness of the fluid thus obtained, under the erroneous notion of its being nutritious, has led to the use of many species of sea-weeds and lichens as articles of diet.

One of the plants of this kind, which has been used most extensively and is still largely employed, is the Iceland-Moss (Cetraria Islandica). It belongs to the family of Lichens, and is a native of the northern parts of Europe. This plant, and other lichens probably contain other dietical secretions besides starch, as we find they are capable of supporting animal life. The Reindeer-Moss (Cetrannce rupestris) is an instance of this. In the northern parts of the world as well as in our own mountainous districts this lichen grows in great abundance, and during the winter season is the principal support of the reindeer. In spite of the extreme cold to which it is subjected, this plant grows with vigour, and the rein-deer, in order to obtain it as food, is obliged to remove with its nose the snow with which it is sometimes covered for many feet. The Cup-Moss (Cenomyce pyxidata) of our own moors belongs to the same genus as the reindeer-moss, and is also used as an article of diet in the same way as the Iceland-Moss.

The Tripe de Roche is another of these lichens which has been long considered in Europe. It has a melancholy interest attached to it, as it has so often formed the chief article of diet of our arctic navigators. Two species of lichens, the Gyrophora procumbens and C. croce, afford the Tripe de Roche. Although they are said to be nutritious, they are described as having bitter, nauseous, and putrefactive properties.

Amongst the sea-weeds which have been used as articles of diet none is better known than the Chondrus crispus, which is the Carageen, and the Chondrilla norvegica, the Pearl-Moss, which has been for a long time used in Europe. It grows on the rocky shores of Europe; and when washed and dried, and then boiled with water, makes a mucilaginous decoction, which, like the preparation of the Iceland-moss, has been recommended for use in diarrhoea, cholera, coughs, and diarrhoea, and other diseases. It has however no bitter principle, and is probably less tonic than the lichen. This and other sea-weeds have been occasionally had recourse to by the poor inhabitants of the seas-shores of Europe, more especially Ireland, when the ordinary corn or potato crop has failed. They contain however but little nutritious matter, and persons soon famish who live upon nothing else.

There are several species of sea-weeds which are often eaten as an addition to other food. Of all these the Laminaria, as a certain flavour of the sea, arising probably from the saline matter they contain, which renders them very objectionable to some persons as articles of food, and which will probably always form an objection to their general use. Of those which are eaten in various parts of England we may mention:-

1. Laver, Sike, Siskum (Porphyra laciniata). It is on all sea-shores; and when employed as food is salted and eaten with oil in the north of Ireland, and in the West of Scotland.

2. Green Laver, Green Sike, Oyster-Green (Ulva latissima). The Ulva is not so good to eat as the Porphyra, and is only had recourse to when the latter is not abundant.

3. Bally-Sea, Sea-Ordles, Blue-Wand, Red Ware (Laminaria digitata). It is cooked by boiling for a long time, and adding pepper, butter, and lemon-juice. Cattle are fed on it when young in some parts of the British islands.

4. Redderyches, Hen-Ware, Honey-Ware, Marline (Alaria esculenta). The part of the plant which is eaten is the think middle rib which runs through the frond. It is sometimes called the Estable Fucus.

5. The Dulse of the south-west of England is the Fucus undulates of botanists. It is eaten by the fishermen of the south-west coasts of England, who before eating it pinch it between red-hot forks. In Scotland it is cooked in the frying-pan.

6. Dulse of the Scutch, Dullerk, Dulliel, Duleig, Water-Leaf (Rhodomenia palmata). The Highlanders and the Irish, before the introduction of tobacco, were in the habit of drying this weed and using it as a masticatory. The plant is fed on as an article of diet under the name of the Sugar-Fucus. In the islands of the Mediterranean Archipelago it is employed as an ingredient to flavour soups, ragouts, and other dishes.

Several other sea-weeds have been employed as food, but generally the principal that are at present used in this country. In Obana the people are very fond of sea-weeds, and many kinds are collected and added to soups, or are eaten alone with sauce. One of these, the Plocaria tenac, if sometimes brought to this country under the name of Chinese Moss. The detection it makes is so thick that it is used as glue. The Cornicul Moss, which has a reputation in medicine as well as a diet, is the Plocaria Helminthocactus, and is found on the coasts of the Mediterranean. Another form of sea-weed is the humicaria which is exported in some quantity from the coast of Australian Moss; but although affording a very thick jelly, it tastes too strongly of the sea to be rendered pleasant by any kind of cooking.

The next dietical substance of which we have to speak is Sugar, which is readily found from the sea by various properties. Sugar is soluble in water, whilst starch is only digestible through it. Sugar is susceptible of fermentation, and of being converted into alcohol, which starch is not. Sugar has a peculiar sweet taste, whilst starch is insipid. It is on this account that a species of sugar is found in the south-west of Scotland, and in other parts, which, so very seldom, find it in plants in a solid condition. It is always dissolved in the water naturally contained in the plants in which it exists. Sugar is not so frequent a product of vegetable change as starch; but it is, nevertheless, very generally found during some period of the growth of the majority of plants.

Sugar, like starch, is not nutritious, but is taken into the system with the object of maintaining animal heat. Persons may even get fat on sugar, but it is most perhaps nourished by any of the carbonaceous productions of plants. It is true, that in countries where the sugar-cane is grown, slaves and their children, during the period of its gathering, partake of it in large quantities, and are nourished upon it; but it is to this system of economy, and the consequent other alimentary principles besides sugar, which assist in the nutrition of the body.

Sugar, being readily soluble in water, is more digestible than starch. Of the substances which maintain animal heat, it is one of those substances which does not undergo any reason why it is supplied to the young of the higher forms of animals. For this purpose it is secreted, by the female of all the Marsupiata, in the milk, which is furnished universally to their young during the first months of their existence. The instinctive love of sugar, so well known as a distinguishing character of the child, seems to point out its adaptation to the wants of the infant system. Readily digestible however as sugar is, it is one of those substances which is converted into fats in the stomach; and when we consider how the stomach and the system, its elements seem to enter into secondary combinations, which are very injurious. This is why so many persons find it necessary to limit the quantity of sugar which they take in their diet. The changes how ever which proceed the most readily understood, and the way in which each of the atoms of sugar are not do appear to take place in children; hence the child may eat sugar with impunity, although its parents may not.

Although there are various kinds of sugar, having a different degree of sweetness, and oil and sugar would seem to act diestically in the same way upon the system. The most common is sugar of plants, and that which is most frequently eaten in diet, is Cane-Sugar, so called from its being yielded by the sugar-cane. It consists of-

<table>
<thead>
<tr>
<th>Atoms</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>12</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>12</td>
</tr>
<tr>
<td>Oxygen</td>
<td>9</td>
</tr>
<tr>
<td>Water</td>
<td>9</td>
</tr>
</tbody>
</table>
The other kinds of sugar which are eaten, are milk-sugar, \( \text{C}_\text{6}\text{H}_\text{12}\text{O}_\text{6} \cdot \text{H}_\text{2} \text{O} \); and grape-sugar, \( \text{C}_\text{6}\text{H}_\text{12}\text{O}_\text{6} \cdot 2 \text{H}_\text{2} \text{O} \). It will be seen that the cane-sugar resembles starch in its position, and it is probably formed in the plant from that body. Although cane-sugar is found in the sugar-cane, the beet, and the maple, it is not so frequent in plants as grape-sugar, which is the form in which sugar is found in the fruits and parts of the plants which may be called fruits.

The sources of sugar, as an article of diet, are of course very various; it is only separated however from a limited number of plants. Of these the principal is the Sugar-Cane (Saccharum officinarum L.), the cultivation of which by the inhabitants of France is principally obtained from the Beet (Beta vulgaris). In tropical countries it is obtained from the juice of palms, as from the Jaggery Palm (Carpopterus urens), the Cocoos-Nut Palm (Cocos macrofura), and others. It exists in the sterna of all grains, and is prepared in America, from Mazo (Acor Myers). The Birch (Betula alba) in this country, and the Sugar-Maple in America (Acer saccharinum), also yield it in their sap.

Grape-sugar, also called Glucose, is found in the fruits of most plants, and it is to act on the system in precisely the same way as cane-sugar.

The result of the fermentation of grape-sugar is the production of Alcohol, which does not differ much in composition from sugar. The following is the decomposition:

\[
\begin{align*}
\text{Alcohol} & = 2 \text{Atoms of Carbon} + 2 \text{Atoms of Hydrogen} \\
\text{Water} & = 2 \text{Atoms of Hydrogen} + 1 \text{Atom of Oxygen}
\end{align*}
\]

One Atom of Grape-Sugar = 12 14 12

Alcohol is taken as an article of diet in the form of beers, wines, and spirits. Although resembling sugar in its composition, its effects on the system are very different. It acts on the nervous system as a stimulant and sedative; and it might perhaps be regarded as one of the medicinal forms of food. A question has arisen amongst physiologists as to the action of this substance on the system. Liebig, and with him many others, maintain, that, like starch and sugar and all, the food is part taken up by the system, and thus by combustion assist in maintaining animal heat. On the other hand Dr. Carpenter, and those who repudiate the use of alcohol in diet, maintain that it is not destroyed during respiration, and consequently does not promote animal heat any further than it stimulates the heart's action.

Alcohol when taken as an article of diet not only acts upon the nervous system, but on account of its chemical action on albumen exerts an injurious influence when taken in large quantities, and is the cause of the so-called pot-stomach. It is thus that when indulged in, it becomes a source of indigestion, and lays the foundation of serious diseases. Taken in small quantities in the form of wine or beer, it seems to exert a beneficial influence on the digestive functions, and to belong to that class of foods to which spices and condiments are referred. Taken medicinally it is often capable of exerting powerful effects, on account of its resorting action upon the vascular system. It does not seem to be necessary to health, as there are many nations that never use it, and individuals, in countries where it is habitually taken as an article of diet, find their health not materially injured by forbearing themselves from its use.

The quantity of alcohol contained in fermented beverages varies very much.

With regard to wines, when the juice of the grape contains large quantities of sugar in comparison with the water, and the fermentation is complete, than the alcohol is abundant, and strong wines are produced; whilst when the sugar is in small quantities, or the fermentation is incomplete, weak or thin wines are the result. Ports and sherrys are strong wines, whilst those of the Rhine are generally weak.

Sweet wines are those in which all the sugar is not converted into alcohol, and come from grapes other than those made from other fruits besides grapes. Hence the well-known sweetness of what are called British wines. This does not however arise from an imperfect fermentation, but from the acid contained in other fruits not being tarteate of bicarbonate of lime, which has the property of preserving the insaline salt (the cream of tartar) with potash, which is generally found in fruits; and in wines made from the grape this salt falls to the bottom of the cask, forming the tarter or less of the wine. But other acids, as citric, malic, and oxalic acids, are not thus precipitated from their solutions, and they remain in wines, giving them a very acid flavour, which would render them unpleasant, unless sugar was added to cover their acidity. Sweet wines are objectionable as articles of diet, on account of the sugar they contain, which, when held in solution in wine, seems more likely to decompose, and thus prove injurious to the system than when it has been in its pure form. In wines made from other fruits besides grapes, the acid is also liable to objection.

Efferescent wines are those which are bottled before the fermentation is complete, so that a large quantity of the carbonic acid, which is the other constituent of the wine, is still in solution in the wine, and escapes when the bottle is uncorked. Such is champagne. Efferescent wines are more liable to disagree with delicate stomachs than others, on account of their imperfect fermentation rendering them liable to further change in the stomach; and this change is probably communicated to the substances used as food contained in the stomach.

The skins and stalks of the grapes, if not the juice, contain alcohol. This substance is a pure extract of alcohol, and its presence seems to be the cause of the astringent character of many red wines, as port, claret, and others. There is also a difference in the quantity of free tartaric acid contained in wines; and those which have the largest proportion of this constituent of the wine, are least likely to change from grapes are so sour as to be very unpalatable; this is more especially the case with the poorer white wines of the Rhine.

The quantity in which wines differ from each other most is what is called their bouquet, or flavour. It differs in wines made from different kinds of grapes, and differs in the same grape in different districts and in different seasons. It is well known that the vintage of one year produces a better or worse wine from the same grape, and this depends on the development of the peculiar flavour of the fruit of alcohol. As such, it might be regarded as a bouquet which is independent on an acid which he calls enanthetic, and which, combining with the alcohol, forms an other which gives the odour and flavour to wines.

The quantity of spirit in wines varies very much. The ports and sherrys consumed in England contain the largest quantity. But then much of this is added. It is added in the form of brandy. Brandy wines keep best, but are not the best to drink. Unless wines are naturally strong, they will not keep without some spirit added. Clarics, hocks, and Moselles, are seldom brandied. Some of the hocks do not contain more than seven per cent. of alcohol, whilst port and sherry contain twenty-five per cent.

Ardent spirits, distilled liquors, derive from wine in their having been part distilled with the wine, which produces the alcohol. Brandy is distilled from wine; and pech-kernels, or other vegetable matter containing oil of bitter almonds, are added to give it a flavour. All the rums are the product of the sugar-cane, the Rosaces, called Amygdalin, contain oil of bitter almonds. Rum is distilled from molasses or treacle in the West Indian, and pine-apples are added to give a peculiar flavour. Gin is distilled in Holland, from rye; in this country from wheat, the grains of which are allowed to become saccharine, and then fermented. Juniper berries are employed to give the peculiar flavour to gin. Whiskey is distilled from wheat, barley, or oats, treated in the same manner as for gin. Nothing is added to flavour it; but the smoke of the peat is used to give the colour. The following introduces a slight but distinct difference between Irish and Scotland, gives a characteristic flavour to this liquor. Liqueurs belong to this division; they are distilled spirits containing large quantities of sugar, and are flavoured with all kinds of substances, as celery, bitter almonds, gentian, wormwood, &c.

Beers, ales, and porters, differ from wines in the addition of a bitter principle, most frequently the hop, to the fermented liquor. The saccharine matter for fermentation is thus obtained there from. The hops are added after the water, and allowed to germinate. When the starch of the grain is converted into sugar, it is submitted to heat, and malt is formed. The malt is placed in boiling water, and hops added; when cooled, the process of fermentation is allowed to take place, and the beer is complete. As the malt is slightly charred during the process of drying, it gives a dark colour to the beer. It is then called porter. These fluids vary much in strength and bitterness, according to the quantity of malt and hops employed.
Beer is the safest of these beverages for habitual use; but even this may be indulged in too freely, and disease may be the result. Of the various kinds of beer, that which is to be most commended, is the weak form of bitter ale, which is now so generally employed in the households of London and other large cities as a tonic on account of its bitter principle, as well as a stimulant, and is frequently, on this account, found to be a valuable addition to the ordinary diet.

The Oligoeclon group of foods is somewhat peculiar. They are taken in various forms from both the vegetable and animal kingdoms, and are known under the name of butter, oil, lard, suet, fat, &c. The following formula will express the composition of this class of bodies:

<table>
<thead>
<tr>
<th>Carbon</th>
<th>Hydrogen</th>
<th>Oxygen</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>10</td>
<td>1</td>
</tr>
</tbody>
</table>

It will be seen that the oxygen is in considerably less proportion than in the foregoing substance of this group, and we may consequently conclude that the hydrogen as well as the carbon is consumed in the system in maintaining the animal heat. This is an important point, as it frequently happens that the value of the heat-giving properties of foods is diminished by the quantity of carbon alone. That oil has more power in maintaining animal heat than sugar or starch, is seen in the fact that it is eaten in larger quantities by men who live in cold regions than by those who live in the warmer parts of the earth. Just as the fruit from the tropics, man adds oil to his food according to the degree of cold to which he is exposed.

Oil seems also to be deposited in the tissues of man and other animals as a source of combustible materials when those derived from the vegetable kingdom alone are insufficient. The vegetable fat is appropriated by the fat in summer to supply them with their winter's store of fuel. Nybeytating animals, which are fat when they commence their sleep, wake up quite thin. Their fat has been exhausted in maintaining their animal heat, during hibernation.

Oil performs another function in the system. It is very evident from its general presence in every tissue of the body that it has an action in connection with the development of the protoplasmatic tissues. It seems to assist their development, to act as a kind of preparation for their growth. In this way its curative action in certain forms of disease may be explained. There is no doubt of the beneficial action of cod-liver oil in scrofulous diseases, and its action can only be explained on the above supposition. In connection with the use of cod-liver oil it may be stated that animal oils appear to be in a different physical condition of aggregation from vegetable oils, and are certainly more readily digested and assimilated by the system.

The vegetable oils chiefly used as food are those obtained from the Olive (Olea Europaea) and the Almond (Amygdalus dulcis). Many seeds, as the Cocoa-Nut (Cocos nucifera), Almond (Amygdalus), Chestnut (Castanea), Walnut (Juglans), Brazil-Nut (Carylus), Brazil-Nut (Bertholletia), contain oil.

The fat of animals is the great source of oleaginous food from the animal kingdom. We now come to speak of the Nutritious, Prototannaceae, or Nitrogenous articles of diet. The substance called Protein is the basis of these. It is the first element that appears in the development of the vegetable cell. It is consequently universally present in plants. It also constitutes the chief and essential element of the protoplasm of both kingdoms various forms, and is called albumen, fibrine, and casein, according to its physical and chemical properties.

Some animals derive this constituent of their bodies directly from the vegetable kingdom, as all the herbivorous and granivorous creatures derive it indirectly from the plant through the animal, as the various forms of Carnivora. Man obtains his supply of protein from both sources. As a sect has arisen of persons who deny the presence of the so-called "protein" in vegetable food, it may be well for us to examine the evidence on which their claim to be regarded as a flesh-eating animals rests. We shall dismiss the sentimental objection, that life ought not to be taken as unworthy of serious notice, and every one must feel that for carnivorous animals to prey upon lower animals is a natural law, as well as a practice is universal, and it is precisely amongst these people that we see the greatest amount of physical power, and moral and intellectual development existing. Amongst these nations, those individuals and classes who partake most largely of or are entirely a vegetable diet, are not only physically, and morally degraded. It is a well established fact, that amongst those classes who get the least animal food, as also in those public establishments where meat is only sparingly allowed, mortality is greatest, and disease is the most common. One of the most common symptoms of disease is manifested by an exclusively vegetable diet is scurifals, and when traceable to this cause, the most speedy remedy is the addition of animal food to the diet. There are also many other forms of disease produced by the want of animal food, which are not the disease of man's body but an abundant supply of the needed material. I need not, I am sure, specify facts to verify this statement. The experience of every medical man would confirm it, and there is no surgeon or physician connected with the structure of man's complex mechanism, who has every day, unfortunately, ample opportunities of witnessing the ill-effects of a vegetable diet, and the benefit, in such cases, of the administration of animal food.

"Nor are we at a loss in accounting for the beneficial action of the flesh of animals as food. From what I have before said, it will be recollected that the muscles and other tissues of animals are composed principally of protein; so that they truly constitute the most nutritious kind of diet. It has also been found, not alone as a matter of general perusal, that the most carnivorous animals are the healthiest and most digestible than vegetable food. The experiments to which I allude are those performed by Dr. Beaumont of America, on a man that had received a gun-shot wound in the stomach. The man lived 10 years, and we are all of the opinion that this wound never healed, and, enabled Dr. Beaumont to perform the experiments alluded to. By placing various kinds of food in the stomach of this man, he was enabled to ascertain how long each required to digest; and it was found that the flesh of animals is much sooner digested than the more nutritious forms of vegetable food, as bread, and the preparations of flour.

"Could we not find reasons for partaking of animal food in its nutritiousness and digestibility, we might find ample justification for the structure of men by comparing man with the lower animals. To the comparative anatomist it is sufficient that he knows the structure of the teeth, jaws, or stomach of an animal, to tell whether it fed on vegetable or animal food; and when he has once determined the structure that characterises the one or the other combined, he will know that the animal will require both kinds of food. Let us, then, for one moment glance at the structure of the teeth, jaws, and stomach of vegetable-feasting animals, and compare them with the structure of man. It is hardly necessary to assign animals of the ruminant class, as the sheep and the ox, as specimens of pure vegetable-fed animals. On examining their teeth it will be found that they have broad surfaces, made rough for the purpose of rubbing on each other, and between those surfaces, and they eat something which causes them to be swallowed. In order that these teeth may be moved with facility over each other, the jaw, in addition to the up and down movement, which is essential to the reception of the food into the mouth, has a lateral movement, by which the triturating of the food between the teeth may be effected. The tooth thus prepared passes down a long esophagus, or gullet, into a complicated bag or stomach. In the ruminants, though not in all the vegetable-eating animals, a process of further digestion, called fermentation, takes place in the stomach, as the mastication of the food between the teeth, and its ultimate digestion in the stomach.

"If we turn now to the structure of flesh-eating animals, of which the Carnivora, embracing such animals as the lion, and lioness, as well as the ferret, racoon, wolf, and hound, must be excluded, which have long teeth furnished with broad surfaces, they have teeth with sharp points for holding and cutting their food. Their lower jaw has no lateral movement, but a powerful up and down action, which is sufficient to enable them to tear off the flesh in pieces and make them into small bits, by which the tooth is made to act in dividing their food, something in the way of the blades of a pair of scissors when used in cutting. In passing to the stomach, we find the gullet short, and the stomach small and simple in its form, adapted for that food that is readily digested, and is such as has been referred to as a vegetable diet.

"On an examination of these organs in man, it will be found that they are a true mixture of these two classes. His teeth are partly adapted for grinding, while in some of
them are supplied with the sharp projections which are characteristic of the Cornea; thus evidently adapting them for the mastication of both vegetable and animal food. A slight lateral movement of the jaw being continued, the downward action is expressive of the suberviciency of its structure to a mixed diet. In the stomach also we find indications of the same intermediate position in its structure; and the same conclusion is forced upon us, that it is part of the apparatus of digestion dependent upon a diet composed of animal and vegetable substances.

"That man can live on food derived entirely from plants, or entirely from animals, is a well known fact. The natives of many parts of Asia never eat animals; whilst the Hottentots of the Cape of Good Hope, and the aborigines of the northern part of the world, and the Guachos of the Pampas of America, seldom or never have vegetable food; but neither the physical, moral, nor social condition of either the one or the other will prompt the suggestion that man attains his highest development exclusively on either vegetable or animal diet. In the various positions in which man is placed in the world, there can be no doubt that the relative quantities of flesh to food derived from plants, may vary much with great advantage; but there seems to be no position in which man in health can be pronounced to be the better with abstinence from either the one or the other kind of food. That man does subsist on either exclusively only proves the great range of his adaptability, and it is not improbable that it is possible to plant it on the surface of the earth; but certainly it is no proof of his labouring under a necessity for the supply of one to the exclusion of the other." (Lankester, 'Letters on Diet'.)

Of the three forms of protein referred to above, fibrous is found in the flesh and blood of all animals, as gluten in wheat, barley, oats, rye, and the other Cereals. Albumen is found in the juices of many plants, as cabbage, cauliflower, asparagus, &c.; and also found in the nervous system and blood of animals. Casein is present in milk, also in the seeds of leguminous plants, as peas, beans, and lentils.

In the animal body a substance called Gelatin, which appears to be formed out of the proteinaceous tissues. This substance is found in all the vital organs of the body, and what cellulose is in the vegetable kingdom, gelatin appears to be in the animal kingdom. Although often taken into the system with animal food, especially in soups and jellys, there appears to be no evidence that it is ever converted into a proteinaceous tissue. Experiments on this subject have been performed both in France and Belgium on an extensive scale, and the conclusion arrived at was the same, that gelatin is not used for forming any of the proteinaceous tissues. It is generally held, however, impossible that the gelatin may be appropriated for the purpose of renewing the gelatinous portions of the tissues, which are very extensive in the animal body. It will be thus seen that although gelatin cannot be said to be necessary for the vital organs, it is an actively vital part of the body, and may in its absence not only cause the death of the body, but also prevent the restoration of a future existence.

Of the forms of protein which occur in food, Casein demands a short notice. Although, as dissolved in milk, it is a very digestible it becomes, when in an unabsorbed state, the cause of indigestibility. When milk is deprived of its butter, and the pure casein made into cheese, it is the case with some English cheeses, as those from Suffolck, it becomes so hard as scarcely to be digestible. Cheese, in most cases the casein is curdled with the hater, and a large percentage of this substance is found in all good cheeses. Still cheese is made by adding the cream of one milking to that of another, so that this cheese has double the power of the butter. This process of condensation of separated or insoluble casein will perhaps explain the neglect of beans, peas, and lentils, as articles of diet, although they contain a much larger quantity of nutritious ingredients than meat.

In conclusion, upon this subject, we present our readers with a summary of the conclusions on this subject arrived at by one of our most recent physiological writers. Dr. Carpenter, in his 'Principles of General and Comparative Physiology,' thus concludes this part of his subject:—

"The waste of the tissues, of which gelatin is the basis, may be supplied either by alburneous, proteinaceous, or gelatinous compounds, since there is no doubt that alburneous compounds are the best for the purpose. Although the reverse process cannot be performed. As gelatin does not exist in plants, it must be formed in herbivorous animals at the expense of the alburneous elements of their food; whilst in carnivorous animals it is probably derived immediately from the gelatinous compounds of the bodies on which they prey. The materials of the adipose tissue, and the olesgenous particles which seem requisite in the formative operations of the system, generally are derived in the carnivorous races from the fatty substances which the herbivorous animals may contain; whilst the herbivorous not only find the olesgenate state in their food, but also have the power of producing them by the conversion of farinaceous and saccharine matters.

"The foregoing statements are applicable to all tribes of animals 'cold-blooded' as well as 'warm-blooded.' We have now to consider the special case of the latter. In the carnivorous tribes the waste of the tissues is so great, in consequence of the restless activity which is habitual to them, that it appears to furnish a large proportion of the combustible material required for the maintenance of their proper temperature. The remainder is made up by the fat of the animals on which they feed: and it is to be observed that the amount of the heat produced in this case is not far from the colder regions of the globe than in the inhabitants of tropical countries. In the herbivorous tribes the case is different: they are for the most part much less active; and the waste of their tissues consequently takes place in a less rapid manner. It is thus that we find the herbivorous animals, having an adequate amount of combustible material, especially in cold climates. Their heat is in great part sustained by the combustion of the saccharine and olesgenous elements of their food, which are appropriated to this purpose without having ever formed part of the living tissues and the adipose matter, or at any rate in proportion to the depression of the external temperature, a greater generation of calorie being then required to keep up the heat of the body to its proper standard. Hence, cold-blooded animals can never sustain the exertion of food longer than warm-blooded, and this more especially when they are kept cool, so that they are made to live slowly, and death when at last does ensue is consequent upon the general deficiency of nutrition. On the other hand, warm-blooded animals, whose temperature is uniformly high, must always live fast, and deprivation of food is fatal to them, not only by preventing the due renovation of their tissues, but also by destroying their power of sustaining their heat. The duration of life and these circumstances depends upon the amount of fat previously stored up in the body, and upon the retardation of its expenditure by external warmth, or by the inclosure of the body in non-conducting substances; and there is evidence that if this be duly provided for, and all the other necessary precautions such as a uniform activity be practiced, the life even of a warm-blooded animal may sometimes be prolonged for many weeks without food.

"It will be gathered from the foregoing general remarks that food may be divided into two great classes—the heat-giving and the flesh-forming; and we now present a table of some of the more ordinary kinds of food, in which one or the other, or both, of these classes of substances are found mixed.

<table>
<thead>
<tr>
<th>Material</th>
<th>300 Grams of Tea gives an infusion 5 grains of theine and 265 grains of non-nitrogenous substances. (Peligot.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogenous material</td>
<td>22.3</td>
</tr>
<tr>
<td>Carbohydrate material</td>
<td>14.3</td>
</tr>
<tr>
<td>Mineral matter</td>
<td>5</td>
</tr>
<tr>
<td>Water</td>
<td>37.1</td>
</tr>
<tr>
<td>Fat</td>
<td>62.9</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The quantity of carbon expresses the relative heat-giving power of the food. With foods containing fat the quantity of hydrogen should also be taken into consideration."
Such a table as this will be found useful in constructing dietaries for large institutions, which are very often erroneously constituted, and a large waste thereby entailed. The following table contains examples of dietaries, drawn up by Dr. Lyon Playfair, from various sources. This table accompanied an abstract of a lecture by Dr. Lyon Playfair on the Food of Man, delivered at the Royal Institution in May 1853. The following extracts from this lecture will explain some of the valuable results obtained by Dr. Playfair.

To show now, it is known that the heat which was due to the combustion of the unassailed ingredients of food, man inspires annually about 7 cwt. of oxygen, and about 1-6 of this burns some constituent and produces heat. The whole carbon in the blood would thus be burned away in about three days unless new fuel were introduced as food. The amount of food necessary depends upon the number of respirations, the rapidity of the pulsations, and the relative capacity of the lungs. Cold increases the number of respiration and heat diminishes them; and the lecturer adduces well-known cases of the necessity of residents in arctic regions, although he admitted, as an anomaly, that the inhabitants of tropical climates often show a predilection for fatty or carbo-naceous bodies. He then drew attention to the extraordinary records of animal dietaries in the Various civilized Nations, admitting that they are extreme cases even in the arctic regions, are nevertheless very surprising.

"Dr. Playfair then adduced to the second great class of food ingredients, namely, those of the same composition as flesh. Becarria in 1743 pointed to the close resemblance between these ingredients of flesh, and asked, 'Is it not true that we are composed of the same substances which serve as our nourishment?' In fact the simplicity of this view is now generally acknowledged; and albumen, gluten, casein, &c., are now recognised as flesh-formers in the same sense that any animal aliment is.

"The old mode of estimating the value of dietaries, by merely recording the number of ounces of solid food used daily or weekly, and quite irrespective of its composition, was shown to be quite erroneous; and an instance was given of an agricultural labourer in Gloucestershire, who in the year of the potato famine subsisted chiefly on flour, consuming 69 ounces weekly, which contained 269 ounces of flesh-formers. When potatoes cheaped again he returned to a potato diet, and now eats 291 ounces weekly, although his true nutrient in flesh-formers was only about 8 or 10 ounces. He shows how, further by calling attention to the six peeper dietaries formerly recommended, to the difference between the salt and fresh meat diet of the sailor, &c., all of which, relying on absolute weight alone, had in reality no relation in equivalent nutritious value.

"The soldier and sailor as illustrating healthy adult men, they consumed weekly about 35 ounces of flesh-formers, 70 to 74 ounces of carbon, the relation of the carbon in the flesh-formers to that of the heat-givers being 1-2. If one of the aged were examined with this it would be found that they consumed less flesh-formers (25-60 ounces), but rather more heat-givers (73-78 ounces); the relation of the carbon in the former to that of the latter being about 1-6. The young boy about 10 or 12 years of age consumed about 17-2 ounces as flesh-formers of the adult man; the carbon being about 85 ounces weekly, and the relations of the two carbons being nearly 1-8. The circumstances under which persons are placed influence these proportions considerably. Work-house dietaries were observed to require large amounts of fuel food to the body; while the relative amount of labour determines the greater or lesser amount of flesh-formers. Accordingly it is observed that the latter are inactive, and the former active.

"The vitamin in flesh is so important as to recommend the quantity of flesh-formers in food we may estimate approximately the rate of change in the body. Now, a man weighing 140 lbs. has about 4 lbs. of flesh in blood, 27 lbs. in his muscular substance, &c., and about 5 lbs. of vitaminous matter in the bones. The 140 lbs. would be kept in food in about eighteen weeks; or, in other words, that period might represent the time required for the change of the tissues, if all changed with equal rapidity, which however is not at all probable.

"As carbon as food is not burned in the body, part of it being excreted with the waste matter. Supposing the respiration to be 18 per minute, a man expirers about 8-69 ounces of carbon daily, the remainder of the carbon appearing as vitaminous matter.

"The substances used as food which we have called medicinal are very numerous. They include acids, volatile oils, and the vegetable alkaloids.

"The acids are eaten in fruits, such as the citric, malic, tartaric, and oxalic acids. It is possible they may be decomposed in the system, and furnish the materials of animal heat. They seem however to perform a more important part in dissolving up the mineral ingredients taken into the system as food. This seems one way in which carbonic acid is produced, the other being the action of the acids on the effervescence of waters. Acetic acid, or vinegar, acts probably in the same manner as the other acids.

"The volatile oils are added to other kinds of food, and, as condiments and spices, form a conspicuous feature in the action of the mucous membrane of the stomach.

"The use of tea, coffee, chocolate, and Paraguay tea, in infusions, constitutes a curious class of alimentary substances. To Dr. Playfair's cuisine, tea was the only article for which he gave an example, to every instance, to which the names Tea or Caffein has been given. A substance very similar, Theobromine, is found in chocolate. It is undoubtedly upon the action of these substances that the distasteful uses of these plants depend.

"The last class of this principle is Liebig suggested that the taurin found in the bile was formed from the waste tissues of the body carried into the blood; and that this taurin was necessary for the production of carbonic acid gas, or rather to get rid of the carbonic gases in the system in the form of carbonic acid gas. The taurin must be constantly formed, otherwise the heat of the body is not maintained, the carbonic matter not got rid of, and disease is engendered. If persons have not sufficient food, or if the digestive organs do not enable them to carry a sufficient quantity of nutriment to the system, the tisues of the body are consumed to form taurin. Liebig found that the latter had a composition identical with taurin, or so nearly as to render it a sufficient substitute. The same theory is applied to the combination of half the food we have been talking of as meat, to the half of the bodies we were actually preventing the waste of the body, and so maintaining health at such expense as we could by taking more solid food.

"Persons who cannot consume a sufficient quantity of food to yield the carbon necessary for generating animal heat, have recourse to tea, and find it actually a nutritious article of diet; and it is only, says Liebig, 'by such means as this that it can act as a nutritive agent.' But another theory has been given, that taurin is the condition of the composition very similar to nervous matter. Now, seeing that every operation of the mind must be attended with a loss of nervous matter, there is a necessity for a supply of that nervous matter to enable the mind to carry on its operations. A large quantity of proteinaceous matter would be
required to be supplied to form the nervous matter with proper constituents if taken in by means of meat or bread. But these alkaloids at once become a constituent of nervous matter; and this accounts for the agreeable stimulus and permanent effect on the mind produced by the use of tea and coffee, particularly by studious persons, as well as those whose nervous systems are exhausted from various causes.

In any just estimate of diet the mineral ingredients should be considered. The forms which they assume in the system are not well known, but we have a capital instance in the phosphate of lime, which, forming a part of the bones, we know must be supplied through the diet. This substance is found in the cereal grains, and perhaps one reason that man takes these grains everywhere for the substantive articles of his diet is the possession of this substance. Iron is another substance which is frequently deficient in the blood. It is naturally supplied in the food; but this failing, iron is given medicinally. Potash in combination with vegetable acids seems to have the power of preventing scurvy. Chloride of sodium is another well-known instance of the necessity of mineral ingredients in the food.

**Examples of Dietaries.**

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| **Dietaries of the Young.** | | | | |
| Christ's Hospital, Horfield | 216 | 17-16 | 81-27 | 2-47 | 59-18 | 1 | 4-21 |
| Christ's Hospital, London | 242 | 17-27 | 78-22 | 2-84 | 48-95 | 1 | 5-02 |
| Chelsea Hospital, Boys' School | 245 | 12-89 | 79-28 | 2-23 | 57-67 | 1 | 5-29 |
| Greenwich Hospital, Boys' School | 261 | 19-43 | 96-78 | 2-62 | 52-01 | 1 | 5-82 |

| **Dietaries of the Aged.** | | | | |
| Greenwich Pensioners | 263 | 24-46 | 122-21 | 3-54 | 72-48 | 1 | 5-46 |
| Chelsea Pensioners | 320 | 22-85 | 119-54 | 2-05 | 78-59 | 1 | 4-60 |
| Gillingham Hospital, Edinburgh | 156 | 21-02 | 92-32 | 2-33 | 71-39 | 1 | 6-26 |
| Trinity Hospital, Edinburgh | 192 | 19-63 | 97-34 | 3-33 | 57-30 | 1 | 5-88 |

| **Old Fafnr Dietaries.** | | | | |
| Class 1 | 20-21 | 88-81 | 3-77 | 54-30 | 1 | 4-95 |
| Class 2 | 14-98 | 89-59 | 2-80 | 61-10 | 1 | 6-31 |
| Class 3 | 14-73 | 99-68 | 3-91 | 55-43 | 1 | 6-50 |
| Class 4 | 19-22 | 116-84 | 3-98 | 67-87 | 1 | 6-50 |
| Class 5 | 15-49 | 86-51 | 2-86 | 54-72 | 1 | 6-33 |
| Class 6 | 14-67 | 88-63 | 2-84 | 49-37 | 1 | 6-26 |
| Average of all English Counties in 1851 | 32-00 | 29-89 | 2-80 | 58-60 | 1 | 6-93 |
| St. Cuthbert's, Edinburgh | 173 | 14-80 | 89-37 | 3-81 | 46-98 | 1 | 8-85 |
| City Workhouse, Edinburgh | 107 | 13-80 | 49-99 | 1-74 | 31-48 | 1 | 4-86 |

| **English Prison Dietaries.** | | | | |
| Class 2. Males | 206 | 15-28 | 111-65 | 3-45 | 59-23 | 1 | 7-13 |
| Class 3. Males | 276 | 18-26 | 123-60 | 4-05 | 67-53 | 1 | 6-81 |
| Class 4, 6, and 7. Males | 278 | 20-87 | 126-96 | 4-33 | 62-58 | 1 | 6-13 |
| Class 8. Males | 326 | 20-29 | 130-57 | 4-23 | 78-31 | 1 | 6-65 |

| **Bengal Prison Dietaries.** | | | | |
| Non-Laboring Convicts | 224 | 18-43 | 165-18 | 2-96 | 78-35 | 1 | 7-62 |
| Working Convicts | 286 | 28-16 | 191-12 | 2-97 | 91-07 | 1 | 8-96 |
| Contractors' Insufficient Diet | 167 | 12-70 | 155-65 | 1-50 | 61-38 | 1 | 9-88 |

| **Bombay Prison Dietaries.** | | | | |
| All Classes of Prisoners not on Hard Labour | 182 | 26-00 | 101-50 | 2-63 | 88-81 | 1 | 4-82 |
| Prisoners on Hard Labour | 224 | 35-63 | 128-80 | 2-45 | 87-22 | 1 | 4-50 |

| **A few plain rules for taking food will properly conclude this article.** | | | | |
| In the first place, food should be properly cooked. Many substances which are very indigestible when in the raw state are rendered perfectly digestible by cooking. Although the stomach is capable of digesting fruits and some kinds of seeds without any exposure to heat, yet, as a general rule, the breaking down of the tissues which occurs in cooking greatly facilitates the digestion of both animal and vegetable food. But whilst that cooking is proper which enables the stomach more easily to reduce the food to the condition of chyle, there are extremes of preparation which however palatable are to be avoided. Food that is much prepared, so as to reduce it to a fluid condition, as soups, stews, and various made dishes, do not present sufficient solid matter for the healthy process of digestion to be carried on. When
the object is to prevent the stomach from doing duty such food is proper. It may also be taken occasionally with advantage as a variety in diet, but food taken long together in this form is injurious.

Much indigestible food at a time should be avoided. Many of the articles of our diet are less digestible than others and should be eaten in small quantities. It is when such substances are made the principal constituents of a meal that danger is likely to arise.

To mention only a few of the less digestible kinds of foods—Unsifted flour and bread, and biscuits, unsifted vegetables as made by modern manufacture, coffee, tea, salt, pickles, sour milk, curry, ginger, red pepper, unripe corn, apples, melons, apricots, dates, figs, many kinds of fruit, bananas, dates, lemons, oranges, garlic, sauerkraut, unripened meat, bacon, and the fat of meat, some kinds of fishes, especially the Ostreaces, crabs, lobsters, &c. Heavy meals of any one of these articles of diet, or mixtures of them, may be very injurious and produce serious attacks of indigestion, if not other diseases.

Solid food should be well masticated before it is swallowed. The teeth are organs given us on purpose to perform this function, and its accomplishment is attended also with the mixture of the saliva with the food, which seems to be an important step in the process of digestion. Although by hasty mastication persons in business hope to save their time, they should know that at least it is a loss of food, if not impairment of health. Much more is digested when it is well masticated than when it is swallowed very hastily in large masses. Food that is imperfectly masticated is digested with difficulty, and remains sometimes so long in the stomach as to produce irritation of the stomach, and remaining unacted upon it putrefies, producing pain and taint the breath.

Even where mastication is very complete it is always better to swallow slowly, as by this means every part of the food is brought more fully under the influence of the gastric acid of the stomach, by which it is prepared for absorption into the blood. Full and heavy meals should be avoided. It is better to get up off the table with an appetite than to feel that no food is required; and always digest food slowly. Food should be with propriety taken. Some systems will bear twice as much food as others, whilst there are those who require twice as much food as others. Scales and weights are not the best of tables, as some men will starve on what others will thrive. There is an instinct which, if obeyed, constantly cries "Hold, enough;" which if men would listen to would always guide them right. The feelings after eating should be those of refreshment and comfort—feelings that are not often present when too large a meal has been eaten. All food taken into the system and not wanted is likely to be in the way, and the processes adopted by nature for getting rid of the incusus are not unfrequently attended by disease and death.

Persons who habitually over-eat are frequently obliged to have recourse to medicines to correct the errors of their indulgence. Such an unnatural way of correcting the evils of an unnatural habit is itself likely to produce disease in the system.

Active bodily exertion should not be taken immediately after the principal meal. The stomach requires a supply of blood to perform its functions. If the current is diverted to other organs digestion is prevented. On this account reading at meals is an objectionable practice. The brain in this process gets the blood which the stomach requires. Long walks and hard study should both be avoided after a full meal.

Long fasting is bad. It is bad when the body is resting; it is much worse when the body is actively engaged. The stomach, like all other organs, performs its functions in virtue of the stimulus afforded it by the blood. If the blood is allowed to go a long time without a renewal of its constituents it no longer supplies the nervous system with energy to the stomach, and even other organs, flag in the performance of their duty, and as a consequence digestion is imperfectly performed. How often should man eat in the day? In the morning, at noon, and at night, is the answer given by the instincts of man.

The body can go longer without food whilst resting than when awake; hence persons may with safety go a longer number of hours between the night and morning meal than between the morning and noon, or the noon and night meals. There are no rules without exceptions in certain cases, and there are many circumstances which must modify the application of the foregoing rules, as well as in other ways regulate the taking of food.

Age is a perpetually modifying influence. The new-born infant requires the food which nature has provided for its use every hour or two. As it grows older the intervals at which it takes its food become somewhat longer; but there may be instances where children should have more eating times than adults. Grow-up people are too apt to assume that what is good for themselves is good for children; hence as great an amount of suffering is entailed on children by restrictions upon the time and amount of food as by the richness as come upon them from absolute want among the poor. The craving appetite of children is no vice of fallen human nature, but the incessant demands of an ever-wasting yet ever-growing human body. Bread and butter, or trucule, with constant consumption, is never always bad. It is rapidly growing boys and girls between the hours which adults find convenient for their meals. An evil however arising out of the healthy appetite of youth should be guarded against; it is, that while growing children are acquired of eating large quantities of food which are no longer required when growth has ceased. If the appetite is not checked by reason at this period of life, the habit of eating more than is necessary may be productive of evil results.

Other things being the same, more food is required than the adult, though not in so large a quantity. "A little and often" is a maxim that enables many aged persons to continue their influence in the world, whilst an attempt to maintain the habits of youth and middle age has cost many declinists their health and prosperity.

The mode of life influences the diet. The sedentary, the inactiv, do not consume so much muscle and nerve in their existence as the active and laborious, and accordingly require less food. The tailor ought not to eat the same as the day-labourer; and the lady all day in her drawing-room or carriage cannot expect the appetite or the enjoyment of food which is bestowed by the laws of nature on her housemaid.

Other things being the same more food is required in winter than in summer, more in cold climates than in hot ones. This arises from the greater consumption of certain parts of the food in maintaining the animal heat in order to keep off the external cold. Hence, to bring the appetite of Christmas to the Midsummer meal is to run the hazard of a surfeit; whilst the traveller who carries the eating habits of the north to countries under the line frequently perishes of fevers brought on by repulsion.

(Moleschott, Phileologie des Nahrungs Mittels; Ward, Science of Health; Food of Man, in Knight's Shilling Volumes; Lectures on the Food of Man, by Dr. Lankester; Letters on Diet, by Dr. Lankester; Persuasive, On the Diet of Man; Liibig, Chemistry of Food; Liibig, Letters on Chemistry and particularly Botany; Carpenter, Principles of Physiology.)

FORAMINIFERA (Foramen, fer), a group of minute Marine Animals of low organisation, consisting of a slimy transparent substance, with a single chambered, usually spiral, shell; found in non-sand and amongst marine refuse dredged up from deep water. Owing to many of their shells having a spiral form, these creatures were long thought to be homologous with the Mollusca, allied to the living Nautilus—error into which most naturalists fell until recently, when these animals became the subject of a more rigorous and searching investigation than they had previously undergone.

Though usually very minute, their elegant forms easily attracted the attention of naturalists. They were noticed by Gmelin, Planchus, and Ledermerlin, prior to the appearance of the 'Systema Naturae' of Linnaeus. In the latter work they are included amongst the Nautili, the animal, as well as that of the shell. Linnaeus associates them, being alike unknown to the Swedish naturalist. In the 12th editions are descriptions of 15 species. In 1780 Soldani, an Italian priest, published two elaborate works, abundantly illustrated, and largely devoted to the Foraminifera; the forms of Foraminifera were there divided into groups (such as Nautili, Hammonia, and Orthocerata) in the most arbitrary manner; but the works are monuments of his labour and perseverance. In 1784 Dr. Mouchet described the species under the name of 'Testacea Minuta Pariata.' The 'British Conchology' of Moutage, 1803 (and 'Supplement,' 1806), contained a still larger number of British forms, respecting the majority of
which the error of Linnaeus was still followed; but some were shown to be so different from the true Foraminifera as to render the attempt for a classification of the various portions of the shell an impossibility. M. D'Orbigny, in his book on the molluscs, figured many of the spiral forms, which he included amongst the Nautilis. In 1808 De Montfort attempted to subdivide the group into a number of separate genera, but still regarded them as Cephalopoda, in which view he was followed by Sedgwick. In 1826 the study of the Foraminifera received a fresh impulse from the labours of M. D'Orbigny, a French naturalist, who in that year presented his first memoir on the subject to the French Academy. This memoir embraced the classification of the Foraminifera, the characters of the different genera or families allied to the Cuttle-Fish; with which group of organisms D'Orbigny, like his predecessors in the study, imagined the Foraminifera to have the closest affinities. He first subdivided the class into 25 genera, and these again subdivided into a number of genera, most of them new; the various forms being thus thrown into natural groups in a way that had not previously been attempted even by De Montfort. Though D'Orbigny retained the erroneous idea of his predecessors as to the zoological relation of the Foraminifera, this error did not affect the value of his subdivisions of the class, which constituted an important step in advance of all that had been done by others. Indeed the value of his classification is shown by its retention in the zoological works of others who have written on the group which D'Orbigny published.

He distributed the species into 65 genera, introducing into the catalogue an enormous number of new forms, which he discovered in sands brought to him from various parts of the globe, and which he considered as well worth the attention of systematists. Expecting the molluscan character of these animals were sanctioned by Cuvier in an edition of the 'Animal Kingdom' published in 1828.

In 1835 M. J. Dejean presented a memoir to the 'Annales des Sciences Naturelles,' based upon an examination of the recent animals of the Foraminifera, in which he rejected the idea that they had any affinities with the Mollusca. He pointed out the fact that the animal which tenanted the calcareous shell was a mere animal slime, having no visible organs other than those of an isolated, highly organised Cephalopoda, with which they had previously been associated. He considered their true zoological position to be near the Amoeba, commonly known as the Protists Animals, and to those constitute part of a larger group, to which he assigned the name of Ethopoda.

In 1834 and 1839 Professor Ehrenberg presented two memoirs to the Academy of Berlin, in which he advocated the opinion that the Foraminifera were polype-bearing animals, allied to the Polypidae, in which view he followed the suggestion of Cuvier, by which they formed the first order, Polyplaxina. He also assigned to them internal organs which no other observers have been able to discover: but notwithstanding these errors he did good service by the discovery that the genus Ammonites bore no relationship to the Foraminifera, which were the nearest relatives of the shellless molluscs of the Acanthophora, which by their gradual accumulation had thus produced widely-extended masses of calcareous strata, many hundreds of feet in thickness. The existence of numerous fossil Foraminifera in the chalk had been demonstrated by Mr. Lonsdale in 1835; and still later, the rich harvest of beautiful forms to be obtained from these Cretaceous strata was further demonstrated by M. D'Orbigny in his monograph "On the Foraminifera of the White Chalk." In 1845 Professor Williamson published a memoir in the 'Transactions of the Literary and Philosophical Society of Manchester,' in which he further demonstrated the absence of any real resemblance between the Foraminifera and the Polypidae, and the component nature of any resemblance to the former in an inferior portion of the zoological scale. At first he adopted the idea of his own, but in a subsequent memoir (1848), he came to the conclusion that they were not polype-bearing, but that they approximated to the Brachiopoda. In this matter, and had been asserted by M. Dejean, to the Amoebra or the other: their true position in any linear arrangement being immediately above the former of these classes of objects. In another memoir, read in 1861, describing the complicated structure of some forms of the Foraminifera, and the zoological affinities of the animal existing at the structure of the shell of the Ordovican Tabulata, and especially at the large orifices which communicate between its various cavities, we cannot fail to observe that it is a reticulated calcareous skeleton, whose propontiative relation to the size of the soft animal has suffered but little from that of the siliceo-keratoine network of many sponges to the slimy substance with which they are invested. The attempt for a satisfactory classification of the various portions of the shell the Foraminifera. The genus Foraminifera, however, raise each portion to the rank of an individual animal, even in the limited sense in which we should admit such a distinction in the polyplas of a Sertularia or of a Gorgonia, appears to me wholly inadmissible. If the soft structures of the Foraminifera are Lichinaria, and the hard shelled, we British Foraminifera, and I have very little doubt that such will prove to be the case, the whole animal will be very little raised above the Polyplaxina, only possessing a symmetrical calcareous skeleton, which is at once both external and internal characteristic ('Transactions of the Geological Society of London.')

In 1848 M. D'Orbigny published his work 'On the Fossil Foraminifera of the Tertiary Basin of Vienna,' in which he developed the idea that they were the remains of true Cephalopoda, the introduction, the group into the classification of the Foraminifera, the comparison demonstrates that they cannot be arranged in any of the known Zoological Classes. Much less complex than the Echinodermata or the Polyplaxina as to their internal organisation, they are more nearly related to the Polyplaxina, to the order of locomotion of the former, and are by their isolated, non-aggregated, free existence, more advanced in the scale than the latter. This individual existence of the Foraminifera, the liberty which they enjoy, and their mode of locomotion, are characters which deserve to be taken into account. Although less complex than many Polyplaxina, they have not a common aggregate life. A multitude does not unite to form a regular body as amongst the Polyplaxina. They are locomotive, which the others are not, and their mode of locomotion, the regularity of the testaceous envelope of their segments places them far above the Polyplaxina. On the other hand, much less perfect than the Echinodermata, they are very inferior to them in all respects. We believe also that, because of the radiation of their offspring, the position of the Foraminifera is in the interval (embranchment) of the radiating animals of Cuvier, between the Echinodermata and the Polyplaxina, as an altogether independent class. ('Sur les Foraminifères Fossiles du Bassin Tertiaire d'Austria,' p. 230.)

There can be no doubt of their great inferiority to the Echinodermata, which possess a distinct alimentary canal, a nervous circulatory and sexual system; and communicating with the definitive division of these animals. The discovery of a distinct reproduction by ova, through the agency of medusoid forms, we must conclude that these latter are equally removed from the structureless animals of the Foraminifera. In the preceding argument M. D'Orbigny forgets that the freedom, isolation, and independence, upon which he lays so much stress, are the characteristics of the fixed compound Polyplaxina, in their embryonic or larval states. Consequently this feature, which in the Foraminifera is normal and permanent, betokens inferiority rather than superiority to the Polyplaxina, in which aggregation and fixation indicate maturity and a higher development. The argument drawn from their symmetry is of no value. Nothing can be more symmetrical than many of the sponge spicula, and in the vegetable kingdom, the symmetrical plants (Dennidos) are amongst the lowest forms.

An additional memoir by Professor Williamson, in 1851 ('Quarterly Journal of Microscopical Science,' vol. 1.), afforded other and still more striking evidence of the proboscis correspondence of the Foraminifera. He was not published by the structure of a species of Funainasina, and especially showed that the new growth which added to the thickness of the shell were all applied to its exterior and not to its interior, apparently indicating that the gelatinous animal shell, or of retreating to its interior at will, reminding us of the movements of the gelatinous envelope in some of the less highly organised Funiform Corals. (R. Jones, 'Animal Kingdom,' p. 19.) In 1843 Dr. Carpenter laid before the Geological Society of London an elaborate memoir

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on the structure of some interesting fossil forms belonging to
the genera Orbitolina and Nummulina, which with the
publication of M. D'Orbigny on the Foraminifera of Cuba,
constitute the chief additional works that have appeared on
this subject.

The following is the latest classification of the Foramina-
fera adopted by M. D'Orbigny, and though marked by some
imperfections, it is the best that has been hitherto published.
The five principal divisions are chiefly based on the varia-
tions in the arrangement of the success-
ively added segments.

Order 1. Monostega.—Animal consisting of a single seg-
ment. Shell composed of a single chamber. Genera: Ov-
usplina, D'Orbigny; Orbitolina, D'Orbigny; Calina,
D'Orbigny.

Order 2. Stichostega.—Animal consisting of segments ar-
ranged in a single line. Shell composed of chambers
superimposed linearly on a single straight or curved
axis. No spiral growths —

Glandulina, D'Orbigny.

Nodosaria, Lamarck.

Orbigerina, D'Orbigny.

Dentalina, D'Orbigny.

Dorloculina, Defrance.

Lingulina, D'Orbigny.

Order 3. Holocystea.—Animal consisting of segments ar-
ranged in a spiral. Chambers piled up or superimposed
on one axis, forming a spiral volute —

Cristallaria, D'Orbigny.

Mangiulina, D'Orbigny.

Robulina, D'Orbigny.

Rimulina, D'Orbigny.

Pavonina, D'Orbigny.

Conulina, D'Orbigny.

Middletonina, D'Orbigny.

Marginulina, D'Orbigny.

Vulvulina, D'Orbigny.

Lingulina, D'Orbigny.

Order 4. Entomotega.—Animal composed of alternating
segments forming a spiral. Chambers piled up or
superimposed upon two alternating axes, forming a
spiral —

Hispidulina, D'Orbigny.

Astyloculina, D'Orbigny.

Orthocerina, D'Orbigny.

Adamina, D'Orbigny.

Ampitphila, D'Orbigny.

Order 5. Multistega.—Animal composed of alternately
arranged segments without forming a spiral. Chambers
disposed alternately along two or three distinct axes,
not forming a spiral —

Dimorphina, D'Orbigny.

Gastrulina, D'Orbigny.

Fusulina, D'Orbigny.

Textularina, Defrance.

Softulina, D'Orbigny.

Planulina, D'Orbigny.

Planongulina, D'Orbigny.

Astyloculina, D'Orbigny.

Order 6. Agathostega.—Animal composed of segments
wound round an axis. Chambers wound round a com-
mon axis, each one investing half the entire circumference —

Uniloculina, D'Orbigny.

Biloculina, D'Orbigny.

Orthoculina, D'Orbigny.

Faculina, D'Orbigny.

Spherulina, D'Orbigny.

Fusulina, D'Orbigny.

Sphaerulina, D'Orbigny.

Spiralina, D'Orbigny.

Frondiculina, D'Orbigny.

Triloculina, D'Orbigny.

The simplest type of the Foraminifera (Monostega), pre-

cents but a single segment, and is illustrated by the Orbit dealing

with a small spiral shell with a lateral aperture, the interior of which has been occupied by

the living jelly to which the shell owes its existence. The

beautiful symmetrical Logenes, or Flank Animals (fig. 5),

the British species of which have been figured by Professor

Lamarck in the 'Annales of Nat. Hist.' also belong to

this type.

In the order Stichostega, as for example the Nodosaria,
Dentalina (fig. 3), the shell advances beyond the simple

type of the Monostega by a process of linear budding. The
first cell is usually spherical, as in Orbitolina, but through

the orifice in this primary cell there protrudes as a growth from

the contained animal segment, a second segment, usually

a little larger than the first, which speedily increases itself in a

shell covering. This new growth is successively followed by

others developed in the same way, until the organism

attains to its maturity, when it exhibits a series of cells

arranged end to end in a straight or but slightly curved line.

In the Holocystea, a large and conspicuous group, the

gemmation takes place with a spiral bias, producing the

nautiloid form of shell which misled the earlier microscopists.

Sometimes all the convolutions are visible. (Operculina,
fig. 4.) In others the outer convolution embraces those

previously formed, and conceals them. (Orbitolina, fig. 6.)

In a third type all the spiral convolutions are visible on one

truncated half of the shell, whilst they are embracing on the

others (Panulina, fig. 6), thus combining the other two
types. Some genera, like the Stichostega and Holocystea

orders, develop on the plan of the latter, up to a certain

stage of their growth, when the arrangement of the cells

ceases to be spiral and becomes straight (Operculina, fig. 7),
as in the Nodosaria. The orifices penetrating the septa and

connecting the contiguous segments are sometimes single, and

at others numerous.

1. Orbitolina undulata. 2. Logonia affinis, veg. porcellan. 3. Dentalina

Lagenaria; Chalk. 4. Operculina. 5. Orbitolina Lagenaria; Chalk. 6. Pan-

ulina. 7. Operculina.
primary central one, as the thread is around a ball of worsted. (Orthocerasculum, Triloculatum.)

In the great majority of the species the interior of each chamber is simple and undivided, but there are some forms, especially amongst the Helicocystidae, in which the newer and more external chambers are subdivided either by transverse pillars or by complete partitions perforated by one or more apertures, through which prolongations of the gelatinous substance unite the various segments of the soft animal. (Orthocera, fig. 11.) Ordinarily but one such chain of communications exist (animal of Rosalina, fig. 12); but in the cases just referred to, there is a great increase in the number of such orifices, so that the septa become completely cribiform.

The distribution of these apertures affects the gommatum or mode of growth, since it is through them that the new segments are successively formed, the gelatinous substance being extended by a process of budding or sprouting. An increase in the number of such orifices is most common where the consecutive segments present a rapid increase in their size. In the genus Orthocera, this growth is sometimes so remarkable that the new segments soon form concentric circles, embracing all those previously formed. (Orthocera complanata, fig. 11.) In such examples the connecting apertures are distributed round the entire periphery, and gommatum most probably takes place simultaneously through them all; so that the soft animal, if decalcified by an acid, would present a succession of rings, inclosing one another, and connected together by transverse radiating bars.

The memoirs of Professor Williamson have shown that the shell inclosing each new segment is at first very thin; but as additional calcareous chambers are formed, each such addition not only increases the new gommatum of the soft animal, but extends over all the exterior of the former shell. The exact way in which this is accomplished is doubtful; but it is probable that the soft animal has the power of diffusing itself over the shell, and depositing upon its surface additional layers of calcareous substance. Through these formations the delicate processes of the soft animal, termed pseudopodia, are protruded. The exact use of these, whether for tactile, probosidea, and locomotive purposes, or for the inception of new chambers, is not understood; but experiments have been made, which, though not very satisfactory, are sufficient to show that they are capable of accomplishing the process both in a single and double form. The Foraminaria in the calcareous shell present various appearances. Sometimes they are large and conspicuous (Rosalina globularis, fig. 13); at others they are so small that their presence is only to be demonstrated by means of high magnifying powers. Through these forms some of the processes of the soft animal, termed pseudopodia, are protruded. The exact use of these, whether for tactile, probosidea, and locomotive purposes, or for the inception of new chambers, is not understood; but experiments have been made, which, though not very satisfactory, are sufficient to show that they are capable of accomplishing the process both in a single and double form.

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Professor Williamson has also demonstrated the existence in several species of a curious system of intersepas and transverse strata arranged uniformly along the walls of the shell. (Rosalina, fig. 14.) These are especially obvious in the genera Pseudoceras, Ophioceras, and Amphistegina. The tubes open at the exterior of the shell, especially at the periphery of the margings, either by a few large or by numerous small apertures. These canals are probably designed to admit water to the interior segments of the animal, with which they communicate through the minute foramaria. In some cases the pseudopodia are protruded through such of these canals as are situated in the umbilical region; but these appear to be exceptional instances.

The relations of the Foraminaria to Palaeontology render them interesting objects to the geologist. Many of the more recent calcareous shells chiefly owe their origin to the accumulation, through successive ages, of these minute stones. The white chalk rocks are mainly composed of them; vast ranges of Tertiary strata present the same characteristic features; and though the older limestone, having been so altered by pressure and chemical agencies that their origin is less clear, there are many indications that they have primarily resembled the rocks of more recent age—an inference that is rendered probable by the great extent to which sediments now accumulating in the bottom of the sea are charged with these little organisms, and in some cases entirely composed of them.

The fossil Foraminaria are chiefly distinguishable from recent ones in the greater prevalence of specimens of comparatively small size. Though one recent species is sometimes brought from Borneo by Sir E. Belcher measuring more than two inches in diameter, the living forms usually range from the 4th to the 44th of an inch. But the Tertiary strata of the earth abound in examples of the fossil genus Nummulite (Nummulina, fig. 18), so called from their resemblance to coins, which vary from 4th of an inch to the size of half a crown. These are often so abundant as to form mountain masses, extending through the Alps, Northern Italy, Greece, Syria, Egypt, and North-east India. The Mokkadam Mountains in Egypt, where the stones used in building the pyramids was obtained, chiefly consist of these Nummulites which are known to the natives by the name of Pharaoh's Glasses.

The structure of the Nummulites has been investigated by Moser, Jolles and Leymus, and especially by Dr. Carpenter, whilst the specific forms have been studied by M. D'Arocian. The genus belongs to the group of the order Helicocystidae, in which the outer convolutions completely embrace the earlier-formed ones; hence it is only by making microscopic sections or thin slices, that their structure can be fully seen. When such a section is carried horizontally through the centre of the shell the segments present a spiral arrangement; they as well as the aperture being large enough for their small size and consequent great number. In other respects they present few or no essential differences distinguishing them from more recent forms. A still more curious genus, known by the name of Orthoceras, occurs in America, Switzerland, and India; in this latter country it is represented by a species which comprises, with its numerous varieties, a considerable number of the shells which are more perfectly preserved than any other. The shells of Dr. Carpenter have revealed a remarkable structure in this
For the American Educator, see Foraminifera, Forssell, S. I.

Forssell, EDWARD, a celebrated naturalist. He was born in 1815 in the Isle of Man, where his father was a banker. Without any one to direct his taste, he became a naturalist while yet a child. Nothing delighted him so much as to pick up the productions of nature, and add them to his collection. He could read. By the time he was seven years of age he had collected a small museum. His first efforts at naming these objects were made through Turton's 'Translation of the Systems of Naturalists.' Whilst yet a hoy of twelve, he read the 'History of British Fossils,' and by this attempt at original work was the production of a 'manual of British Natural History,' which, although it was never published, was the repository of many of his notes even to the close of his life. His habit of drawing the natural history objects which interested him, led him to think of painting as a profession, and with this object in view he studied for some time in the studio of the late Mr. Saxe in Charlotte-street, London. This profession did not however comply with his restless desire to study natural facts of natural history. He entered the University of Edinburgh with the object of studying medicine. Here under the teaching of Professors Jameson and Graham he first became acquainted with the true principles of natural science, and the views and principles of one of his assistant lecturers himself becoming himself an observer and adding to the already accumulated stores of natural history facts. It was with this feeling that he started with a fellow-student on an excursion into Norway, where he made numerous observations on the rocks, plants, and mollusca of the country, and afterward published the result of his observations in a paper in the 'Magazine of Natural History,' entitled 'Notes of a Natural History Tour in Norway.'

At the very period of his natural history career he had established the importance of the dredge as an instrument of his research, and in his hands this simple instrument became as powerful a means of research as the telescope to the astronomer. With it he swept the bottom of the ocean, measured its depths by the character of its inhabitants, and discovered a law for the distribution of marine plants and animals in depth, as strict as the law which regulated their distribution on the altitude of mountains. His early papers, entitled 'Records of the British Species of Mollusca,' were published in eight volumes of the 'Journal of the Linnean Society,' and five volumes of the 'Magazine of Natural History.' Much of his student time was spent upon the sea in the neighbourhood of Edinburgh, and scarcely ever did he make a dredging excursion, so new was the operation to the naturalist of the time. The species were numerous, and increasing collection of natural objects. His attention was not at all however exclusively confined to marine zoology. Plants were always favourite objects, and no student enjoyed more or profited more largely by the botanical excursions of the late Professor Graham. This habit of excursions he had cultivated a most important element in botanic study, at once invigorating the body, and giving the student a knowledge of the relation of plants to other objects which they could not otherwise obtain. Whilst he held the chair of botany at King's College, London, he never neglected periodical excursions with his students. He was mainly instrumental in 1836 in establishing the Botanical Society of Edinburgh, of which he became the foreign secretary. In 1837 he visited Paris, attended the lectures of the Professor there, and worked in the museum and collections in the Jardin des Plantes. In the same year he visited Algiers and the coasts of the Mediterranean. In 1836 he published an account of the 'Mollusca of the Isle of Man,' and in 1839 papers on the 'Land and Freshwater Mollusca of Algiers,' and on the 'Distribution of the Pulmonifera of Europe.' In these researches he was laying the foundation for the enlarged views, which he afterwards put forth, with regard to the distribution of animals and species of animal and plants in time and space.

His papers from this time became very numerous. The materials he accumulated in his various excursions were truly astonishing. He lived to publish but a comparatively small portion of them.

In 1841 he published a 'History of British Star-Fishes,' containing accounts of several new species, with charming descriptions of the habits of these animals, and incidents connected with them. He says that his own pencil was worthy of a disciple of Bewick. In this year he accepted the appointment of naturalist to H.M.S. Beagle, commanded by Captain Graves, who was commissioned to bring from Lybia the mussels discovered by Sir Charles Fellows. The shells and other objects were brought by him, and those resources of a ship of war were placed at the disposal of a naturalist. The result of this voyage was the discovery of the great law, that among marine animals zones of depth correspond to the latitudes of the earth. On his return, the meeting of the British Association held at Cork in 1843. The detailed results of this voyage were never given to the world, and Forbes always looked forward to the day when a little leisure would permit him to publish in detail his observations. He had a great deal of patience to work on, in view of the disgrace of his country, no position was provided for him in which the necessary leisure could be found, till it was too late.

Other results came out of his Lybian excursions. In connection with Lieutenant, now Captain, Spratt, he published his travels in Lybia, with numerous illustrations made from his own drawings, and notes on the natural history of the Xegam.

In 1845 he was in Lybia that he contrived the same form of rebuttal football which killed one of his companions, the Rev. Mr. Daniel, and from the effects of which he suffered to the day of his health. While away in the Xegam, he was appointed to the Professorship of Botany in King's College, London, vacated by the death of Mr. David Don. Although he had resolved on a visit to Egypt and a dredging excursion to the Red Sea, the offer of a chair in London was too much in accordance with his tastes to refuse. He immediately gave up the medical profession, and became a naturalist for the rest of his life. He gave his first lecture in May 1844, and in the same year he was appointed assistant secretary to the Zoological Society. Both situations contributed to the development of his genius, which with the aid of more profound researches was able to systematise his knowledge, and develop his power of communicating its results, the secretariatship afforded him a means of extending his acquaintance with fossils, and the relations of extinct with recent forms of both animals and plants. These offices however preceded one more important still, that of palaeontologist to the Geological Society of Great Britain. When the Museum of Economic Geology was removed to Jermy-street, and the School of Mines founded, he was made a member of the Committee of Management, which by these appointments from publishing all he had already stored up, he added here fresh stores to his stock of knowledge; and numerous memoirs and papers in the Natural History Journals, the Proceedings of the Zoological Society, and various other geological publications, contributed to the great observing powers and unwearied industry. 'One of the most important of these papers is entitled 'On the connection between the distribution of the existing Fauna and Flora of the British Isles, and the geological changes which have affected their area.' This paper attempts to explain the distribution of the plants and animals of the British Islands, on the hypothesis that they were all diffused from a common centre, and that consequently they must have been disseminated when these islands were contiguous with those countries where the identical species are found. He then brings forward geological evidence to support his assertions, and even goes so far as to point out the fact, that at one time, and that recently, dry ground existed between the south-western portions of the British Islands and America.

In 1854 Professor Forbes was elected president of the Geological Society. In the same year he accepted the chair of Natural History in the University of Edinburgh. He was president of the geological section of the British Association which met at Liverpool in September. He died on the 16th of November in the same year. The Edinburgh chair was the object of his highest ambition. The increasing years of Professor Jameson rendered it not improbable even when he himself was master of the chair that he might one day be able to step. He commenced the duties of his new position with his usual ardour, laid down a course of action which would have required years of development, but he had barely time to deliver a preliminary summer course before he was seized with a disease of the kidneys which proved fatal in a few days.
Besides the works to which reference is made above, he was the associate of Mr. Hanley in a great work on the "History of British Mollusca," which was published in parts, and completed in 1863. This work is one of the most complete and exhaustive on the subject of our native Mollusca, and all the descriptions were written by Forbes. He contributed several valuable papers and maps on the distribution of animals and plants to the last edition of Johnstone's "Physic, Surgery, and Natural History," and also to the "Literary Gazette." His papers were collected together in "Forbes's Literary Papers" by the late Edward Forbes. The third volume of the 'Bibliographia Geolotica et Zoologia' of Agassiz and Strickland, published by the Ray Society in 1860, contains a list of eighty-nine papers and works supplied by the author himself, and arranged in chronological order. His contributions to natural history science were perhaps more numerous during the last four years of his life than during any former period of the same length. Few men have labored more assiduously in the path of natural science, produced a greater impression on the current thought of those who cultivated the same branches of knowledge as himself; and the time has not yet arrived when a clear estimate can be made of the influence he has exerted on the time in which he lived.

FORDINGBRIDGE. [Hamwicks.] FORESTALLING. This offence, long obsolete, has at length, with others of the same character, ceased to exist.

(7 & 8 Viet. c. 94.) FORSYTH, C. W. SEPT. NOT. [MYRTOTIS, S. L.] FORMICA, a genus of insects belonging to the family Formicidae. It is distinguished by having the foot-stalk of the abdomen composed of a single joint, the mandibles triangular, and dentilicate at the edge. The females are destitute of a sting. This genus contains about two dozen British species, the largest of which is the Hill-Ant or Horse-Ant, F. rufa. The nesters in this species are about one-third of an inch long, of a black colour, with the thorax, abdominal scale, and a lateral row of hairs on the hindmost joint in the open ground, in woods, &c., amassing together large quantities of sticks, straws, &c. For a description of these nests see Ant.

F. sanguinea is of a blood-red colour, with the eyes and abdomen black, and the wings dusky at the base. The neuter is similarly coloured, except that the head is darker. The male is black, with red legs. This species abounds in wood, and is one of those which steals the young of other species, reversing them to perform the duties of the nest. Two of the species are parasitic in the nest of the C. cucullata and F. fusca, both of which are inhabitants of this country. The latter species is of a shining black colour, with a slight ashy tinge; its form is rather long, and it is nearly smooth; the three anterior joints of the foot-stalk are of a red colour, as are also the legs; the abdominal scale is large and triangular; and the ocelli are distinct. It establishes its nest under stones, moss, &c., and at the foot of trees, the nest being entirely under ground. Among the exotic species of this genus are to be found many which are extremely injurious or annoying in their habits. Of these the Sugar-Ant of the West Indies is perhaps the most extensively prejudicial. F. saccharivora, as it is called, establishes its nest at the root of sugar-canes, limonies, and similar plants, and the ceaseless gnawing of the trees are either blown down by the violent gales, or so completely deprived of nourishment as the roots that they soon die. Some years ago the injuries committed by this insect were so great that a reward of 20,000l. was offered by the planters to any one who should discover an effectual mode of destroying them, yet nothing could be found to stay their ravages. The aid of fire was even resorted to in vain; the insects rushed into the flames in such myriads as to extinguish it. Heavy torrents of rain at last effected their destruction.

F. indentata, another exotic species, is described by Colonel Sykes as being an extraordinary instance of the operations of instinct in the case of insects. "I have," says he, "observed insects for sweet substances is very great, and their attacks on such things were resisted in every possible manner, yet although the table, on which the confectionary and sweets were, was placed with its legs in water and removed a short distance from the wall, they succeeded in reaching them, to the great astonishment of all, until the mode of access was discovered. Colonel Sykes says, "I observed an ant upon the wall about a foot above the level of the sweets; it fell, and instead of passing between the wall and the table, and alighting upon the ground it fell upon the table." Others followed its example with similar success; and it was no longer a matter for doubt as to how they continued to swarm in such numbers about their favourite food, however carefully guarded generally was the table." FORMICIDÆ, an extensive family of Hymenopterous insects, belonging to the section Aculeata, and to the sub-section Heterogyna of Latreille, comprising the Linnean genera Formicus, Apis, and the numerous tribes of Ant. The family is distinguished by the single sting, which is composed of a single joint, the male of seven. The females and nesters are furnished with a single sting, of one species. Those species which have stings emit an irritating fluid into the wounds which they make, while the stingless species discharge a red transparent fluid on to the skin, causing painful irritation.

The various genera of this family, according to Latreille, are, 
— Formica, Polyergus, Ponera, Myrmica, and Atta
This last genus differs from Myrmica only in having very short palpi; the head of the workers is generally very thick, A. eclecta, A. pergandiana, and A. aurata of the West Indies.

FORMYE. [CHEMISTRY, S. D.] FORRES. [ELGINSHIRE.] FORSTER, FRANK, civil engineer, was born in the year 1800, near Chester, and at an early age was put to learn the business of a collier, working in Westmoreland. After some years, he was intrusted with the management of mining works near Swarms and was afterwards similarly engaged in Lancashire. Whilst thus occupied, about the year 1820, he became acquainted with Mr. Robert Stephenson, under whom he was ultimately employed in the superintendence of some of the most difficult works on the London and Birmingham railway, inclusive of the Kidley Tunnel and the Blists Hill Cuttings, and somewhat later he was resident engineer to the London and Greenwich Railway. He has been associated with some of the most extensive works from near Conway to Holyhead, including the masonry of the Britannia Bridge, and difficult works in sea-walls and tunnels along the line. On the formation of the Metropolitan Board of Works, Mr. Forster was appointed chief engineer, and was instructed to furnish a general report on the London sewerage, for which many plans had been sent in to an invitation some time previously. He very soon suffered from the effects of the arduous duties thrown upon him, and which were rendered more difficult by numerous conflicting opinions and interests. He himself was freely unambiverted upon by the press, and he was at length compelled to resign his appointment, and died suddenly a few weeks afterwards, on the 15th of April 1855, in his fifty-second year. His reports and plans, so well calculated to the service of the country, were destroyed by the destruction of the London reman, and are understood to have formed the basis of the schemes now under consideration, and in which a partial commencement of work has been made.

FORTOUL, HIPPOLYTE, late Minister of Public Instruction in France, was born in 1811. He commenced active life as a literary man by contributions to the 'National,' 'L'Artiste,' and other periodicals. In the earlier part of his career he professed republicanism and St. Simonism, and was befriended by these great philosophers, who published a biography. He was a contributor to the 'Revue de Paris,' and was an unsuccessful competitor for the editorship of the 'Revue des Deux Mondes.' Mean time, by his laborious pen, he won every emanation of European honors. He was made Professor of Literature in the University of Toulouse, where he distinguished himself as a lecturer, and was afterwards rewarded for his services by being appointed Dean of the Faculty of Art. He was also admitted into the French Academy in the section of Sciences and Arts.
LETTERS.

After the revolution of 1848 he was elected a member of the French National Assembly, in which he spoke frequently, and obtained the favour of the Prince President. In January 1849 he ascended to the Eiffel Tower, and on the 1st October 1849, he was one of the six ministers who signed the decree for the confiscation of the estates of the House of Orleans. He was then in a situation of great financial difficulty and energy with which he carried out the imperial system of restriction of the press. He had gone to Ems for the benefit of his health, when he died suddenly as he was conversing with his colleague M. Magnes, on the 7th February 1849. His death occurred on the 9th February, was buried at the public expense, with the firing of guns, processions, and other honours, on the 12th of July, in the church of St. Thomas d'Aquin, Paris.

FOOTNOTE. [Ross and Cromatar.]

FOULSHAM. [Norfolk.]

FOXTAIL-GRASS. [Alopecurus.]

France. The 66 departments into which France is divided are subdivided into 2,169 arrondissements, 3047 cantons, and 36,835 communes, which, except that they have a corporate form of government, do not generally differ much in extent from parishes. Each department is administered by a prefect; each arrondissement by a sub-prefect; and each commune by a mayor (maire). In some departments there are also several officers connected with the arrangement and receipt of taxes, an engineer of roads and bridges, a military sub-intendant, and a company of gendarmerie. In the chief towns of each department, courts of justice are held; in each arrondissement, its tribunal of first instance, and each canton a judge of the peace. The more important departmental capitals are seats of high courts of justice and appeal, and head quarters of Military Divisions. In the following table the area and population of each of the 66 departments is given as returned in the official census of 1851.
According to the census of 1851, the population of France was divided into—Roman Catholics, 34,931,032; Réformés, 260,507; Lutherans, 280,507; Jews, 17,826; Methodists, 6,148; and miscellaneous religions, 26,383. Of the rest the religion was unknown.

The population of France at the commencement of the 18th century was about 13,669,930, exclusive of Corsica and part of Lorraine, which were not then united to France. In the year 1783 the population had increased to 21,769,163, inclusive of Corsica and the whole of Lorraine. In 1784 it had further increased to 24,800,000.

The population according to the different census returns of the present century, has been stated to be as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1801</td>
<td>28,540,583</td>
</tr>
<tr>
<td>1811</td>
<td>31,491,675</td>
</tr>
<tr>
<td>1831</td>
<td>35,781,628</td>
</tr>
</tbody>
</table>

The population of the French colonies in 1851 was as follows:

<table>
<thead>
<tr>
<th>Colony</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algeria</td>
<td>2,600,363</td>
</tr>
<tr>
<td>Senegal and Dependencies (1857)</td>
<td>29,863</td>
</tr>
<tr>
<td>Sénégal</td>
<td>29,683</td>
</tr>
<tr>
<td>Guadeloupe, &amp;c.</td>
<td>128,701</td>
</tr>
<tr>
<td>Martinique</td>
<td>128,910</td>
</tr>
</tbody>
</table>

According to the budget of 1858, the total receipts of the public revenue of France amounted to 1,717,116,190 francs (about 68,686,000L), the expenditure to 1,727,116,171 francs, the expenditure thus exceeding the income by 19,006,881 francs.

In 1856, the entire army of France amounted to 577,686 men, of whom 310,347 were in France, 64,335 in Africa, 107,697 not then returned from the Russian war in the East, and 5367 in Italy.

In 1867, the total number of vessels comprising the navy of France amounted to 325, of which there were 10 of 130 guns, 10 of 100 guns, 15 of 90 guns, 5 of 80 guns, 17 of 60 guns, 17 of 50 guns, 10 of 40 guns, &c.

The constitutional monarchy and representative government which had prevailed in France under King Louis Philippe, the head of the younger branch of the Bourbons, were abolished by the republican revolution of 1848. A republic in form, governed by a president and a national assembly, the members of which were selected by ballot, by a suffrage all but universal, succeeded.

On December 2, 1851, Prince Louis Napoleon Bonaparte, President of the Republic, issued a decree dissolving the Legislative Body, establishing universal suffrage (the assembly had been called with restricted liberties), and establishing a plebiscite, which was to be a president for ten years, and a second chamber, or senate. On the 20th and 21st of December, the French people, by 7,439,216 affirmative votes against 640,737 negative ones, adopted a 'plebiscite,' or decree of the people, maintaining the authority of Louis Napoleon Bonaparte, and giving him the power necessary for establishing a constitution on the bases proposed in the above proclamation. The power thus conferred upon the President resulted in the important state paper dated January 18, 1852, which, contains the constitution under which France has since been governed.

According to this proclamation the President, while he retained that title, assumed more than royal authority. He is responsible to the people alone who had elected him, and not to a national assembly; the command of the land and sea forces, the exclusive initiation of new laws, the right to declare the state of siege, were among his leading attributes. A Senate was appointed, whose number was not to exceed 150, the members to be named for life by the President, who may also give them names. A lower chamber, called the Legislative Body, consists of 361 members, one for every 35,000 electors, and chosen for ten years by universal suffrage, but without the ballot. The sittings of both chambers are to be private, and monthly reports only of the proceedings to be published. No member of either chamber has the power to originate any law; if amendments are adopted they must be sent to the council of state, and cannot be discussed if not also adopted by this body. The President convokes, adjourns, prorogues, and dissolves the Legislative Body. In case of a dissolution a new one is to be convoked within six months. The session of the chambers to last three months.

A council of state, composed of 40 or 50 salaried members, nominated and presided over by the President, decides the projects of all laws. The Senate is not to be transformed into a court of justice. For crimes against the chief of the state and the public safety a high court (as above explained) is appointed. Ministers cannot be members of the legislature. Petitions may be addressed to the Senate, but not to the Legislative Body. The mayors of commune's are appointed by the executive.

In this draught of the constitution the name of Republic was retained, and the title of President; but on December 3, 1852, in accordance with a decree of the legislature dated November 7, 1852, and a plebiscite carried by 7,836,509 votes against 264,401, the name of the government was changed, the Empire was re-established, and Louis Napoleon Bonaparte became Emperor of the French. The successor of the Emperor Napoleon III., the throne being hereditary to his legitimate male descendants, failing which, the succession rests in Prince Jerome Napoleon Bonaparte and his direct legitimate
descendants in the male line by order of primogeniture.

Since the establishment of the Empire some modifications have been made.

FRANKLIN, REAR-ADMIRAL SIR JOHN, was born in 1766 at Spilsby in Lincolnshire. His ancestors were substantial yeomen, and his father inherited an estate in that county, which though small was sufficient to give him local rank as a landlord. Unhappily, however, the property was so embarrassed that he was obliged to sell it, and he became entirely dependent on his commercial profits for the maintenance of his family, in which situation, of which he was besides the subject of this memoir, attained considerable rank and reputation. One, Sir Williamson Franklin, became judge at Madras; and another, Major James Franklin of the Bengal service, was highly distinguished for his scientific acquirements, which procured him the fellowship of the Royal Society.

John, the youngest son, early evinced a great predilection for a sea-life. There is a story told of him which seems to rest on more than mere tradtional evidence. When a school-boy at Louth in Lincolnshire, he availed himself of a holiday to visit to the coast, a distance of twelve miles, in order to see the ocean, on which he gazed with wonder and delight for many hours. His father, who was extremely desirous of affording his son the facility of obtaining a@ sea, procured for him a commission in the Royal Navy, that of a sailer, conceived that by sending him in a small merchant ship to Lisbon, the discomfits of the voyage would effectually cure the lad of his love for the sea, but it had the opposite effect; and accordingly paying him off it was bent on a sea life. He was accordingly engaged as midshipman on board the Polyphemus at the age of fourteen, and in that ship he sailed the celebrated battle of Copenhagen, from which he escaped without a wound, whilst a brother midshipman of his fell.

He next joined the Investigator, under the command of Captain Flinders, his cousin by marriage, with whom he sailed on a voyage of discovery to the coasts of Australia. During this expedition, which combined investigations into natural history with geographical discovery, young Fra@ hick had abundant opportunities—which were not neglected—of acquiring much valuable knowledge. Besides sound practical seamanship he learned the more theoretical and difficult branches of nautical surveying, and was always one of the midshipmen selected to attend the Captain whenever he made excursions in boats, or visited the shore for scientific purposes. After some time the Investigator being unfit for further service, the officers were ordered home in the Por@ pois. In this ship he was wrecked on a coral reef off the Australian coast, and with 94 persons spent nearly two months on a narrow sandbank only a few feet above the sea level, whilst Captain Flinders proceeded to Port Jackson for reparation.

Having fortunately escaped the fate of his chief, who on his voyage home was unjustly detained as a prisoner in Mauritius, Franklin proceeded to Canton with Captain Parkinson, who had charge of the Porpoise, and embarked on board the East Indiaman crowning the British triumph at Trafalgar, for the purpose of returning to England. This ship and other Indiamen were attacked by the French admiral, Linois, in the Straits of Malacca, but Sir Nathaniel Dance gallantly defeated his antagonist. During the engagement, Franklin acted as signal midshipman, and was of considerable service in other ways.

Shortly after his arrival in England he was appointed to the Bellona, Captain Lees, and had the charge on board the ship of the taking of the felucca of Trafalgar. It is recorded that he performed this important duty with singular coolness and intrepidity, although many of his other officers were shot around him. Indeed, out of forty commissioned men, only seven, of whom he was one, came out of the battle unscathed. He now served for two years with the Channel fleet and Rochesford squadron, and then joined the Bedford, in which ship he was present at the blockade of Flushing—off the coast of Portugal,—on the Brazil station, and on the West Indies station. In the latter, he greatly distinguished himself in a gun-boat action, in the course of which he received a slight wound. For his gallant conduct on this occasion he was promoted to the rank of lieutenant.

Having having been established, the attention of Govern@ ment was turned to Arctic discoveries, which, having been inter@ rupted during the long war; and in 1816 commenced the brilliant and remarkable series of Arctic expeditions with which Franklin's name is so honourably associated. The
but his wishes still pointed towards active employment, and consequently, when the Arctic expedition was contemplated, which he had already announced in the admiralty, he did not hesitate to command, when the Admiralty of opinion was that he was the officer best fitted to act as chief. That expedition was originated by the late Sir John Barrow, secretary to the Admiralty, who had published a plan for the discovery of the North-West Passage to India. The plan was received with favor by the council of the Royal Society, which had been referred to the council of the Royal Society was adopted.

The expedition, consisting of the Erebus and Terror, which has become the most famous of discovery in the Antarctic Seas, left England in May 1846. Unhappily its history and fate are still veiled in obscurity; this however, we know, that everything was done to render it efficient; that the officers under Sir John Franklin were men of science, and that all the information and knowledge derived from them represent their commander animated by all the ardour and spirit which characterized his early Arctic exertions.

It would have been unjust to have expected less from such a man, and as his instructions contained the usual discretion power given in these documents, there is too much reason to fear that he fell a victim to his daring attempts to achieve success. It will ever be a matter of regret, though it would have been the happier case, had the Erebus and Terror at the entrance of Wellington Channel caused the search for our countrymen to be directed principally to the north and west of Barrow's Straits; because, although the information brought home by Dr. Rae in 1854, to the effect that they had returned to the arctic seas, an immense white man in spring of 1850 on what is supposed to be Montreal Island, and, at the mouth of the Fish River, cannot be regarded as trustworthy; yet the relics of the expedition proved the correctness of their experience. The Erebus and Terror, Franklin's ships must have been yet within an area comprised within the 70th and 72nd parallels of latitude and the 97th and 100th meridians.

Another expedition, and doubtless the last, has been sent out from England in the spring of this year, under the command of a poet and diplomatist, whose progress and fate is a mystery which still shrouds the fate of the Erebus and Terror, and their crews. The expedition left Aberdeen, July 1, 1857, in the Fox, a screw yawl, under the command of the distinguished arctic explorer, Captain M'Clintock.

FRANZEN, FRANS-MICHAEL, an eminent modern Swedish poet and prosist, was born on the 9th of February, 1772, at Uleborg, in Finland, at that time a province of the Swedish crown. Finland, both before and since its combination with Sweden, though possessed of a language of its own of an entirely different character. Runeberg, at present the head of Swedish poetical literature, is a Finn, and the first effort of Franzen that attracted attention was his poetical elegy on the death of a Finn, in which the two poets were united by the symphony of a poet and a diplomatist, and passed much of his life as ambassador at Paris. The 'Atis and Camilla' of Creutz, which introduced an ease and elegance, before unknown, into Swedish poetry, and the elegy on its author by Franzen produced a commotion in the literary world of Stockholm, by the originality and vigor of its tone, which was in strong contrast to that of the school of Leopold, then dominant, who was an ingenious imitator of French models. The enigmas obtained, in spite of its originality, the great prize of the Swedish Academy. This was in 1794, at which time, and for nine years previous, Franzen had been a student at the Finnish university of Abo. In the following year he set out on a tour to Denmark, Germany, France, and England, and during which he had to witness the great fire of Copenhagen, which destroyed a third part of the city. In Paris he ventured on a piece of composition in French verse, which was printed in a French periodical, and which he reprinted thirty years afterwards in the 'Invention of his Swedish powers, founded on the tale of the revolution, 'Julie de St. Julien.' During his absence he was elected librarian to the University of Abo, and afterwards professor of literary history. After the transfer of Finland to Russia by the war of 1808, he resolved to return there, where he had been the subject of bitter satire. At first he officiated as pastor of Kuma, in the diocese of Stargraves, a parish remote from the capital, but he was afterwards minister of the church of Clara at Stockholm, where the poet Chorēs had preceded him; and in 1834 he was chosen Bishop of Hernsand. While still a resident in Finland, he had been chosen one of the eighteen of the Swedish Academy; a distinction of the same importance for a literary man in Sweden, as to be a member of the Royal Literary Academy in England. After being made a member of his society, and remained so for ten years, during which it was part of his duty to write a series of biographical notices, which were much admired for their literary merits. He appears to have resigned the secretarieship on his elevation to the bishopric of Stockholm in 1847. Leaning in his travels in Sweden gives an account of his meeting with Bishop Franzen on board of a steam-boat, when going on a visit to his northern diocese, and speaks of the general affection and veneration with which he was regarded.

Archbishop Wallin, Bishop Tegnér, and Bishop Franzen were three of the most distinguished poets of Sweden in the present century. They were all three associated in the new Swedish version of the Psalms, for which Franzen was appointed to the chair in 1814, and respecting the excellence of which there is but one voice, it being generally regarded as the best in Europe. It is singular that so little reference has been made to this fact, in the frequent discussions that have taken place on the expeditions of obtaining a new poetical version of the Psalms in English. The poetical works of Franzen were collected in five volumes, at Oebro in 1834 and subsequent years. The most successful are decly in the songs and sonnets, particularly the 'Adventures of a Christian' and 'The Northern Gallery.' His last and best work was the 'Sons of the North,' both in Sweden and Finland. Their prevailing character is sweetness. The longer narrative poems, one of which 'Sten Sture,' extends to twenty cantos and fills an octave volume, are of a somewhat dry simplicity, both of style and incident, and approach in manner to the 'Nineteenth Century.' The Franzen was regarded by Swedish writers as belonging to neither of the two rival schools of poetry in his time and country, the 'Academic' or Classical, and the 'Phosphoristic' or Natural, of which, however, the last was generally followed by the most distinguished writers. His sermons, of which four volumes were published, are unusually animated; he was also the author of some controversial writings against the doctrines of the Rationalists, called forth by the controversy respecting Strauss's 'Life of Jesus.' The chief of his two works, above mentioned, have been collected under the title of 'Minnestextknigar.' In the introductory speech before the Swedish Academy prefixed to them, the reader remarks a tone of courtly deference in speaking of Charles XII., and even of the Russian government, to avoid living under which he left Finland, the absence of which would perhaps have inspired a higher notion of the dignity of Franzen's character.

FRASERBURGH, [ABERDEENSHIRE, S. I.]

FRATRELLA, a kind of Grass belonging to the order Frangillaceae and the division Insecta. The seeds are straight, longer than deep, conic, and pointed; mandibles nearly equal, cutting edges entire, forming a straight combed surface; generally 7 to 11 lateral, 3 to 6 frontal. Wings with the first quill-feather longer than the fifth, but a little shorter than the second or third, which are equal, and the longest in the wing. Legs with the tarsi of moderate length; toes divided, and adapted for hopping and perching; claws curved and sharp.

FRANZEN, FRANS-MICHAEL, a distinguished writer of Finland, who was the author of several volumes of political and historical works, and is remembered for his portrait of Charles XII., which was engraved on a medal by C. H. H. A. Bas.

FRANKFurt, the principal town of Germany, at the mouth of the Main, and on the right bank of the Rhine, where it is joined by the Main. It is an important commercial and manufacturing center, with a population of about 600,000. The city is famous for its beer, and is also the site of the University of Frankfurt, which was established in 1379. The town is situated in the Province of Hesse, and is the capital of the Frankfurter Kreis. It is a center of trade and industry, and is also the site of the Main-Kinzig Museum and the Frankfurt School of Art. The city is also known for its Christmas market, which is one of the largest in Germany.
and also naked Seeds (Semina nudae); such as Convolvus, Opodelcas, and Loranthoeca. But there are some plants in which the germen is easily destroyed, so that the seed-bud is developed without an envelope to the seed; these, in order to distinguish them from the former, are termed Semina denudata, as Lonicera and Polygala.

Fruits may be divided, according to the analogy of the flower, into Naked and Covered (Fructus nudus et Fructus tectus), according as the germen only appears to exist, as in Lilium, or as this is surrounded by other floral parts, as in Antirrhinum. The germen itself is sometimes called a Simple Fruit (Fructus simplex), as in Nigella; when several, a compound or Multiple Fruit (Fructus multiceps), as in Rammacectus.

The parts of a Fruit are the Pericarp, the Spermatheca, the seed, and the Pulp.

The Pericarp is the transformed germen; sometimes it is united with the other persistent parts of the pistil, style, and stigma. The latter are seldom of particular importance; and all that need be said of them is that they are sometimes retained, as in Papaver, or they are more developed, as in Pulatitula. The forms of the pericarp are exceedingly diversified, but admit of no general definition: they frequently exhibit hairs, prickles, protuberances, and membranous expansions, or junctions of the ovules in their interspaces (valleculae), &c. The pericarp essentially determines the varied appearances of the fruit, by its diversity of structure. The parenchyma of the germen is developed in various ways. In the simplest cases, we find in the ovules only the embryo and its coverings, and between these a uniform layer of parenchyma, without vascular bundles, as in the lower Araceae, or traversed by a few simple bundles. In other cases only the epidermis of the outer surface is perceptible, whilst the entire parenchyma, with the epidermis of the inner surface, is succulent or fleshy, as in Atropa; or it may be, that under the epidermis of the outer surface some layers of cellular tissue are woody, whilst the underlying are fleshy; in both cases very frequently passing without determined boundary into the pulp.

In many other cases four layers are distinctly discernible, and have been named, counting from without inward, Epicarp, Mesocarp (also Sarcocarp, or Flesh, caro); and the inner under-lying portion, the Koepfera. Those varieties of structure in the fruit are most important which cause the peculiar solutions of the continuity in the fully matured condition. Hence we obtain two comprehensive classes of fruits, according as their construction causes a separation into individual parts or not. The latter may be termed the berry-like, and the former the capsular. The capsular are again divided into two groups, according as the pericarp either opens and suffers the seed to escape—Capsules; or remains closed, as enclosed or separate, or parts of the pericarp which do not again open, but firmly inclose the seed—Splitting Fruits (Sichicos), and their parts called Mericarps. The Berry-like Fruits are also subdivided in accordance with the number of the inner layers, as the more tough and solid, and the outer the more fleshy and juicy—Stone Berries (Drupes); or the reverse—True Berries (Baccas); or, lastly, all the layers appear thin and dry, or leathery (Achenia). All these forms may, with the germen from which they arise, be superior or inferior, one or many-seeded: one or many-seeded; which only require to be noticed when deviations in the structure of the germen have arisen through abortion, being otherwise self evident.

Fruits occur in the most diverse families. The mode of bursting (Dehiscentia) need not be observed. The simplest process is an apparent wholly irregular tearing open at any place, as in Nicandra: usually however the form of this dehiscence is very regular, even though it may be confined to a small part of the fruit, as in Popaver, Antirrhinum, &c.

The solution of continuity is either vertical or horizontal: in the latter case the upper part forms a kind of cover upon the seed; the capsule is termed circumscissile. In the first case, the valves separate, as in Coccus, and Pilocarcis; or separate pieces, which are termed valves. In many-coloured fruits the valves may separate entirely from the persistent sepal, as in Coccus accicosus (dehiscentia sepaliformis); or the sepal may be much smaller, as in Capsa, or divided into several parts, as in Solanum. The pericarp may be one of these lamellae on each of its margins (dehiscentia sepalica, valvulina marginis sepalor). or the sepal may remain united, adherent to the middle of the valves (dehiscentia loculisida, valvulina medio septifera). If in any of these kinds of dehiscentia a stalk-like mass of cellular tissue remains standing in the axis of the fruit, it is called the Columnella.

From what has been said, it is sufficiently evident that those solutions in the continuity are not at all dependent upon the original composition. Such a relation has been assumed; and to the line in the external circumference of the pericarp, where the edges of real or pretended carpal veins have become blended, the term (dorsal suture, has been applied. But this line is never seen on the line where the margins of one and the same carpel or similar part have become blended.

In the generality of capsular fruits, the above-mentioned fissions in the pericarp may be distinguished from one another; but they are usually very thin and membranous or leathery, or more rarely woody.

6. The Sichicos, or Splitting Fruits, are usually distinguished chiefly according to the direction in which the leaf is split. This is either parallel with the axis of the fruit, or perpendicular to it, that is, the solution of continuity is either vertical or transverse. In both, the separate parts are usually only one-seeded. In the first case the separate parts are sometimes termed Coccis or Mericarps, in the last case more commonly as Carps. This distinction, according to the texture of their layers, as dry, coriaceous, and succulent. The first (the mericarps) are proper to the families Rubiaceae, Ephorbiaceae, Labiata, Boraginaceae, Gt~...
The dilated disc, whilst in the Strawberry (Fragaria) the sweet juicy part is the receptacle.

The terms applied to the fruits of plants by botanists are very numerous. The various kinds of fruit have several names, whilst the same name has been applied to several different kinds of fruits. The following enumeration of some of these terms is given by Schleiden in his "Principles of Science," who remarks on this subject with care attention from those interested in the further development of this subject.

 Enumeration of the Various Forms of Fruit.

I. Seed naked (Senex nudum).
   A. Seed solitary.
   B. Fructifications.
   II. Simple Fruits (Fructus simplex).
      A. Capsule (Capulis).
         + Superior.
      B. Ovulaceous (Ovulae).
      C. Carpelaceous (Carpoles).
      D. Bilocular (Biloculi).
      E. Trilocular (Triloculi).
      F. Polysperma (Spermata).
      G. Exocarpium.
      H. Endocarpium.
      I. Exocarp and endocarp.
      J. Mesocarpium.
      K. Spermatophora.
      L. Fructus.
      M. Fructifera.
      N. Fructiferous plant.
      O. Fructiferous tree.
      P. Fructiferous shrub.
      Q. Fructiferous herb.
      R. Fructiferous root.
      S. Fructiferous stem.
      T. Fructiferous flower.
      U. Fructiferous fruit.
      V. Fructiferous plant.
      W. Fructiferous seed.
      X. Fructiferous pollen.
      Y. Fructiferous spore.
      Z. Fructiferous sporangium.

III. Multiple Fruits (Fructus multiples).
   A. Several Achasina.
   B. Several Baronia.
   C. Several Berloja.
   D. Several Fructifications (Fructus compartus).
      A. Capsula with a flat or cup-shaped fleshy peduncle.
      B. Spike with fleshy bracts and perianth.
   E. Several Baronia.
   F. Several Berloja.
   G. Several Fructifications (Fructus compartus).
      A. Capsula with a flat or cup-shaped fleshy peduncle.
      B. Spike with fleshy bracts and perianth.
   E. Several Baronia.
   F. Several Berloja.
   G. Several Fructifications (Fructus compartus).
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   E. Several Baronia.
   F. Several Berloja.
   G. Several Fructifications (Fructus compartus).
      A. Capsula with a flat or cup-shaped fleshy peduncle.
      B. Spike with fleshy bracts and perianth.
   E. Several Baronia.
The antheridia are borne on branching jointed threads, called Paramenata, which rise, like the spores, from the walls of the conceptacle, and commonly fill the greater part of its cavity. Each antheridium is an elongated cell forming the terminal articulation of the branches of the paramenata, and is filled with minute orange-coloured bodies called Sporidia (by J. Agardh), closely resembling the zoospores of the lower Algæ, and like the latter endowed with spontaneous movements. Each antheridium becomes a mature, and at length are consolidated into a single spore, as in Fucus, Himanthalia, &c.

FUCACEÆ, a natural order of Algæ, or olive-coloured inarticulate Sea-Weeds, whose spores are contained in spherical centres, immersed in the substance of the frond. The root has almost always a conical disc, rarely branching or creeping. The fronds are of an olive-brown or olive-green colour, becoming darker in drying; of a tough leathery substance, and fibrous texture, tearing lengthwise with facility; dichotomous or pinnate; rarely irregularly branched, and very rare of the simple form; not infrequently, there is no distinction into parts (as stem, leaves, conceptacle), but the fructification is equally dispersed through all parts of the plants; in others (Durvillea Sarcorhynus) there is a stem ending in a phyll-like or leaf-like frond, from which the fructifications are scattered; in others (Himanthalia) there is a simple frond of small size, and a branching receptacle of fructification resembling a frond; in others (Fucus Cystoclonium) there is a branching or imperfectly leafy frond, some portions of which are wholly or partially hollow and contain the receptacles of fruit; and, finally, in the most perfect kinds (Sargassum Marginaria) there is a branching frond, well-formed mostly different and named leaves and receptacles, from which the last is set apart as organs of fructification (not formed by swelling of the stem, but forming either in the axis or along the edges of the leaves or branches. Air-vessels are present in almost all, either in bladdery swellings of the stem and branches, as in Fucus, or as distinct organs, as in Sargassum, stalked, and mostly springing from the same part as the fructification. Receptacles of the fruit, mostly more or less distinguishable from the barren portion of the frond, swollen, succulent, often filled with alimy mucus, either formed from the metamorphosed ends of the branches, or evolved from the axils or sides of the branches or leaves. Those receptacles are pierced by minute pores, which communicate with small spherical chambers formed by an introduction of the walls of the receptacle at the points where they perforate. The cells of the chamber, called Conceptacles by some writers, Scaphidia by others) contain sometimes spores, or reproductive bodies, analogous to the seeds of more perfect plants; sometimes antheridia, supposed to be the remains of the stamens; sometimes both organs in the same chamber. These chambers are formed in a single chamber. One of the surface-cells being fertilised, gradually enlarges, projects from the wall of the chamber, becomes more or less oblong, and finally is converted into a peristome, or mouth, and in some cases, the peristome is contained within the enlarged cell. At first the contents are nearly fluid, of a pale olive colour; gradually they acquire density and become more or less opaque, and at length are consolidated into a single spore, as in Fucus, Himanthalia, &c.

The frustules are easily known from all other Ollivaceous Sea-Weeds, by a character at once natural and easily ascertained, the fructification of this group, within little hollows sunk in the substance of the plant, and communicating with the surface by a pore. The order is represented in most climates, from high northern and southern latitudes to the equator. Very few species vegetate in the polar regions of the earth, none the species of Fucus and Himanthalia alone reach to the icy sea; and in the Antarctic Ocean the order is limited to Durvillea and to Sargassum. Scaphidia, a fine Algæ allied to sub-tropical forms. The British species, excluding three doubtful natives, are but fourteen; yet from the strictly social habits of several of them, they cover more surface of tidal rocks than all the other Algæ put together. It is these plants which impart the deep brown colour to the belts of rocks exposed on the rock face.

The following is a synopsis of the British genera of these plants:—


2. Halidrya.—Frond linear, pinnate, leafless. Air-vessels divided into several cells by transverse partitions.


I. SARCOSEM,—Frond furnished with distinct, stalked, serrated leaves, and simple axillary stalked air-vessels. Receptacles small, linear, tuberculated, mostly in axillary clusters or rosettes. Seeds in distinct cells. The generic name is from Sargasso, the Spanish term for masses of weed floating in the ocean in some latitudes.

1. S. vulgaris; and...

2. S. bacciferum, though both of them have been found cast on our shores, have no just claim to a place in our flora, being natives of the tropics, occasionally driven, with other tropical productions, by the currents of the Atlantic Ocean. The species of this genus are found over a wide extent of ocean, and have been generally called Gulf-Weed. They appear like floating meadows in the midst of the ocean, the name the species of Fucus, being probably support a larger number of living creatures than the most productive pasture in Great Britain. Myriads of Mollians, Radiata, Fishes, and Crustacea may be seen playing about in these masses; and the abundance of Zoophytes which find shelter in such situations can hardly be estimated. The weed is eaten in China. In the East it is used as salads, and forms a pickle.

II. HALIARUS has compressed linear fronds, pinnated with distichous branches. The air-vessels are lanceolate, stalked, divided into several cells by transverse partitions. The receptacles are terminal, stalked, cellular, pierced by numerous pores, which communicate with immersed spherical conceptacles.

III. CROTONARE has frond furnished with branch-like leaves, becoming more filiform upwards. The air-vessels are simple, arranged within the substance of the branch-like leaves consecutively. The receptacles are cylindrical, more or less lanceolate, tuberculated, and terminal. The seeds in distinct cells. The name is derived from two Greek words, signifying a little sea, and a chain.
C. articulata has a thick woody short stem, cylindrical, and is covered with numerous slender filiform branches, variously divided, and densely clothed with small spino-like awl-shaped rami (or leaves). It is found on rocks in the sea, and has the property of being indigestible when under water in a growing state. In drying it becomes nearly black, and does not adhere to paper.

The other British species of the genus are—C. granulata, C. Verticillata, and C. filiformis. The former is more a rock than a seaweed. In some cases it seems difficult to determine as to the duration of this plant. Sometimes it is annual, as the thongs are produced every year; but others say the long thongs are only receptacles, that the cup-shaped disc is perennial, and that this part is truly the plant. The cup-shaped disc or receptacle, which sends out the plant discs, is more than an inch in diameter. The branches or receptacles are in Scotland about six feet long. In Cornwall they are sometimes twenty feet long. The name in English signifies Sea-Thongs. The fruit consists of taberces immersed in the fronds, and these taberces discharge their seeds by pores, which give the thongs a spotted appearance. This is remarkably the case when, after lying on the shore for some time, every pore is covered with a yellow dot, which is the result of the plant disc which goes on, when, torn from the rock and tossed about by the waves, it lies withering in the open air.

Dr. Neil mentions that in the north of Scotland a kind of sause for fish or fowl, resembling ketchup, is made from the cup-like or fungus-like fronds of this plant and named "Sea-Thongs." (Harvey, British Marine Algae; Landsborough, British Sea-Weeds.)

FUCHSITE, a Green Mica from the Zillerthal, containing 4 per cent. of oxide of chromium. From the crystallisation of mica from salt water has been named the old species so called. The common mica has an oblique prism for its primary. Many micas when in perfect crystals have the form of a hexagonal prism, and but one axis of primary crystallisation; this last fact is the primary to be a regular hexagonal prism. This species is properly distinguished, and has been called Hexagonal Mica.

FULLER, S. MARGARET, MARCHIONESS OSSOLI, was born at Cambridge-Port, Massachusetts, United States of North America, May 23, 1810. Her father, a solicitor and a member of the Congress, perceiving her early aptitude, had her so highly educated that she was accustomed to speak of her while quite a child as "knowing more Greek and Latin than half the professors," while she herself says that she had nearly forgotten her native tongue from constantly reading other languages. The consequence was, that when she grew to womanhood she had an overpowered nervous system, was a somnambulist, very near-sighted, and in general strongly emaciated, but perfectly dogmatic, and unconquerably clever, as well as cultivated person. The sudden death of her father in September 1839, threw upon her domestic duties and obligations to which she resolutely and without affection addressed herself. She was at the age of 12, and was called the Horner Fullers. It resembles the preceding species, but is much thinner and more transparent, the midrib is more distinct, and the leafy part is narrower, although it is a more graceful plant than F. articulata.

F. articulata, Serrated Sea-Weed, is very common on all our sea-shores. It is the Sea-Weave, Bladder-Fucus, Kelph-Weave, Black-Tang of Scotland, and sometimes Lady-Wrack. In Gotland, according to Linnaeus, it is the plant of the Midsummer Night and is esteemed with a little coarse flour they give it to their hogs. In the Hebrides, chilies are dried without salt, being covered with the ashes of this plant, which abounds with salt. In Scania it is the salt that is drawn and which a root is a hard flat disc. The fronds are from 2 to 3 feet in length. The air-vessels, as large as units, are in pairs; the receptacles, in pairs, and often forked, terminate in branches. There is a variety of this which is often called Fucus Balticus. It is found among stones and moss in many ground long and loosely overflown by the tide. Lightfoot mentions that during the snow-storms in the Highlands, the red deer descend from the wild mountains to feed on this sea-weed. He mentions also that the saponaceous mucus of the vessel has been recommended to remove glandular swellings, and the calcined powder of the plant is said to be valuable as a dentifrice. The great use now made of this weed, as well as of others, is in the manufacture of kelp and iodine.

F. knobbed, known as the Horned Fucus. It is found with it in England, and is called the Horned Fucus. It resembles the preceding species, but is much thinner and more transparent, the midrib is more distinct, and the leafy part is narrower, although it is a more graceful plant than F. articulata.

F. nobilis, Knobbed-Wrack. The root is a large hard conical mass, from which spring several branches, from 2 to 4 or 6 feet in length. It is called in some places Yellow Wrack. In England it is often called Sea-Whistle, in consequence of the custom among children of converting the vessels into whistles. The air-vessels are called crackers; for which reason it is sometimes called the "Cracker" Fucus. F. Mackie is found on muddy sea-shores, usually in land-locked bays and among boulders. The frond is from 6 to 10 inches long, densely tufted; branches crowded, spreading, compressed at the base, cylindrical upwards. The venation is rather obscure, and simple, the frond in substance leathery; when dry somewhat horny.

F. canalicularus, Channeled Fucus. This is abundant on rocks on the sea-shore near high-water mark. It is perennial. Cattle are exceedingly fond of it, and never fail to browse on it in winter as soon as the tide leaves it within their reach.

VI. H. L. T. has coralline orbicular top-shaped fronds. Very long strap-shaped receptacles, repeatedly forked, spring from the centre of the frond, filled with mucus, traversed by jointed fibres, and pierced by numerous pores, which communicate with immersed spherical conceptacles, containing either parietal spores or antheridia. H. L. T., or Asian, is a rock scourer of some kind. It seems difficult to determine as to the duration of this plant. Some consider it as annual, as the thongs are produced every year; but others say the thongs are only receptacles, that the cup-shaped disc is perennial, and that this part is truly the plant. The cup-shaped disc, which sends out the plant disc, is more than an inch in diameter. The branches or receptacles are in Scotland about six feet long. In Cornwall they are sometimes twenty feet long. The name in English signifies Sea-Thongs. The fruit consists of taberces immersed in the fronds, and these taberces discharge their seeds by pores, which give the thongs a spotted appearance. This is remarkably the case when, after lying on the shore for some time, every pore is covered with a yellow dot, which is the result of the plant disc which goes on, when, torn from the rock and tossed about by the waves, it lies withering in the open air. Dr. Neil mentions that in the north of Scotland a kind of sause for fish or fowl, resembling ketchup, is made from the cup-like or fungus-like fronds of this plant and named "Sea-Thongs." (Harvey, British Marine Algae; Landsborough, British Sea-Weeds.)
The writings of Margaret Fuller will have no permanent value in themselves, either for their literary merits, their social opinions, or their estimates of character, of art, or of literature. But they will retain a certain value, in connection with the history of their author, as illustrative of a peculiar phase of society in America during the second quarter of the 19th century. Margaret Fuller herself was undoubtedly a woman of great ability as well as of considerable attainments, but she had thoroughly studied a single subject, and her writings are all disfigured by dogmatism, assumption, and self-reference. In them you often come upon a striking and apparently original thought; but if the thought was not put on for a moment, it appeared to show its uncommonness mainly to peculiarity of expression; and sometimes these peculiarities degenerate into grotesqueness. Had her life been spared however there can be little doubt that what was strange, and almost repulsive in her first volumes, and in her later and more refined works, both of these works we believe, were reprinted in London.

In the spring of 1846 she put in execution a cherished scheme of a prolonged European tour. She first visited England, where she stayed some time, and obtained introductions to many of the literary notabilities, whom she describes and criticises in her letters with a most amusing air of superiority. In Paris she also remained for some time, and formed the acquaintance of Madame Dudevant, &c. But Italy was the country she most desired to visit, and thither she next proceeded—little dreaming to what a strange conjunction all her theories of woman's rights and slams and missions there would be brought. For a brief space she revelled in the enjoyment of the scenery, the climate, and the boundless topography of Italy. But it must be confessed that a portion of her time was occupied in rendering herself conspicuous by her open and resolute, though somewhat imprudent avowal of extreme democratic opinions, and intercourse with persons obnoxious to the authorities on account of their political sentiments. She had been involved in an affair of a very different sort than not less exciting nature. She met by accident at Genoa, in St. Peter's, Rome, while separated from her friends by the crowd, a young Italian gentleman; he behaved with a courtesy that charmed her, his intimacy was easy, and though he was many years her junior, so utterly uneducated that he had scarcely ever looked into a book, and without any kind of intellectual pretensions, the strong-minded worshipper of intellect with a very fair fortune and a handsome figure, the Marquis Ossoli, though of a noble family, had a very small patrimony, and that was in the hands of trustees. Moreover his family were devoted Roman Catholics, and his elder brothers held high appointments under the papal government; they would of course be bitterly incensed at his marrying a lady not of that faith, and especially one who was an avowed liberal. He therefore urged that the marriage should be strictly concealed; and to this she submitted. They were married in December 1847, and Madame Ossoli remained in Rome, occupied with her munificent plan for a girls' school; indeed she was not till more than a year after the birth of a son that even her own mother was informed of the marriage. The sudden ascendency of liberalism in Rome however altered matters; the Marquis left, and on his return to Madrid, took, as it would seem, to bear evidence of it. She had to come from him to various Italian liberals; and she had converted her husband to her own political creed. When the revolution broke out her husband threw himself heartily into the movement; and she shrunk from none of the duties which her position and her opinions seemed to have devolved upon her. During the siege of Rome she was occupied as nurse, having charge of one of the hospitals opened by the Roman Commission for the succour of the wounded, and acted with a noble disregard of toil and danger. Thus she much added to her greatest kindness in her self-imposed task. The fall of the republic compelled her to leave Rome; and with her husband and her child, she, after staying the winter at Florence, embarked at Leghorn in May 1850, on board the Elisabeth, for America. From the first the voyage was uncomfortable to the captain died soon after the ship sailed; the weather was throughout stormy; and though the vessel reached the American coast, it was only to be wrecked there, having stranded on Cape Hatteras. Long Island. A few of the passengers and crew were saved, but Margaret Fuller, her husband, and child were among the drowned. The body of her child came ashore, but her own tomb was the ocean.
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from the parent oell, as, for instance, In Peniciltium
In others the thread-like cells form a spherical
swelling at the extremity, from which project a number of
such prolongations, each of which contains a spore, while
the whole forms a divided sporangium, as, for instance, in
Mucor and PenicUlhm.
"In others (Gasteromycetcs, the ventricular Fungi) the
thread-like cells combine
into pointed, or non-pointed,
variously shaped sporocarps ; in or upon which are spores,
of the development of which we know nothing.
After the
scattering of the spores, the thread-like cells often remain as
tender wool, as in the Trichiacece, or as a delicate network
(eapilliiinm), as, for instance, in Stemoniti* cribraria ; and
the external capsule (uterus peridium) generally composed
of fine filamentous cells, is then dissolved, or bursts in different regular ways, as in Arcyria and Geattrum.
"In the most highly developed Fungi {Hymenomycetes,
membraneous Fungi), elongated pouch-like cells (probably
only the ends of the interwoven filiform fungus-cells, developed into the sporocarps, or cells formed at the ends of these
cells) combine oy arrangement side by side so closely as to
form a membrane (hymenium).
Some of the cells of this
membrane enlarge considerably (sporangia), and send out
from one to six points at their free extremity, in each of
which a spore is developed.
The filiform cells of the fungus
then either form round masses^ closed in all round (sporocarps), with cavities in their interior, the walls of which
are clothed by the hymenium, or they form definitely
arranged columns in Merxsma, tubes in Polypcrus, or lamellae
in DtedaUa and Agarieut, which are clothed by the hymenium, as in the Hymenomycetes.
Of the latter we only know,
with any amount of accuracy, the law of development relating
to the Toadstools, and more especially that of the Agaricinea.
arising

in the air.

and Botryiia.

plants.

In these latter there are formed, at definite parts of the floecnlent mycelium, small hollow heads (volvas), at the bottom

the cavity of which there grows a corpuscle, shortly
pedunculated below, and enlarged into a spherical form at
the top.
In the lower part of this protuberance a horizontal
circular cavity is formed, to the upper surface of which are
attached the tubes, lamellae, &c, which bear the hymenium.
The bottom of the cavity is only formed by a membrane
(indnsiuro), which is either separated from the pedicel on its
farther development, or, loosening itself from it and the
upper part at the same time, remains as a membranous ring
(aonulus) upon the stalk.
The upper part, which supports
the hymenium on its lower surface, dilates subsequently,
and appears as an umbrella-like expansion, called the cap
(pileus).
The whole then breaks through the volva, which
of

very soon dissolved."
During their growth the same Fungi assume very different forms and appearances.
It thus happens that the same
species has not only been described under different specific
names, but even referred to different genera. Fries states
that he has traced no less than eight genera of different
authors to mere degenerations or imperfect states of Thekphora tulphurea. Nees von Esenbeck also states that the
is

same fungoid matter which produces Sclerotium mycetospora
in the winter, developes Agaricus volvaceus in the summer.
Professor Henslow has also shown that some of the supposed
species of Urcdo are forms of Puccinia, Aregma, &c.
Kiitang, in an essay on the ' Transformations of Plants,' carries
his views on this subject very far, and maintains that according to different circumstances the same species will produce
Algce, Fungi, Lichens, or Mosses.
In the article Entofhyta, S. 2, will be found an account
of the plants growing on man and living animals.
Many of
these are Fungi.
Professor Balfour, in his ' Class-Book of
Botany,' gives the following account of diseases in plants
produced by Fungi:
* The attacks of Parasitic Fungi cause extensive injury
and disease in plants.
Some think that the spores of Fungi
coming into contact with the plant act both as the predisposing and exciting cause of disease j others, perhaps more
correctly, think that some change is first produced in the
cells of the plant, which enables the spores to find a nidus,
and then the disease goes on rapidly, assuming a peculiar
type on account of the presence of the fungus in the same
way as vegetable organisms found in diseases of the skin are
not to be looked upon as the origin of the disease, but as
being developed in textures previously morbid, and as giving
often a peculiar character to the disease. Many of the
diseases of cultivated crops are attributed to Fungi.
The
•pores of Fungi are very minute, and are constantly floating

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They can

easily be applied to the surfaces of
they find an appropriate soil they send out
extensive filiform ramifications, which spread under the epidermis of plants, raise blisters, and finally burst forth in the
form of orange, brown, and black spots, constituting the

When

They attack the stem, leaves, flowers, and
Different species are restricted to different plants, and
even to different parts of the same plant. The forms which
fructification.

fruit

the same fungus assumes seem to vary sometimes according
to the plant on which it grows.
The disease called Bunt,
Smut-Balls, or Pepper-Brand, is occasioned bv the plant called
Uredo caries by De Candolle, and Uredo faetida by Bauer.
It attacks the grains of wheat, and may be detected in them
in their earliest state.
It consists of extremely minute
globules of a dark colour, at first attached to a thread-like
matter or mycelium. Bauer estimates the diameter of each
of the globules at l-1600th of an inch, and consequently a
grain of wheat (reckoned at less than 1-1 000th of a cubic
inch) would contain four millions such spores. The spores,
or powdery matter, have a disgusting odour ; hence the specific
name given to it. The disease is propagated by contact.
Steeping the grain is recommended by some as a means of
prevention, and alkaline solutions have been suggested as a
remedy.
Uredo linearis, which is met with also in this
disease, is considered as being a young state of the Mildewplant.
Another disease called Smut, or Dust-Brand, is
caused by a fungus called Uredo segetum. It resembles the
Bunt fungus in colour and shape, but its spores are not half
so large, and it does not possess a fetid odour.
This fungus
destroys the ear of corn by first causing the innermost parts
of the flower to become abortive, while the pedicels on which
these are seated swell and become very fleshy.
The fungus
then consumes the whole of this fleshy mass, and at length
appears between the chaff-scales in the form of a black sootlike powder.
It is said also to attack the stem and leaves.
When ripe the spores burst through the epidermis, and are
dispersed in the form of a black powder like charcoal. The
spore is 1 -2800th of an inch in diameter. Smut is rare in
wheat ; it is common in barley, and more so in oats. It is
also seen in many grasses, such as A rrhenatherum avenaceum.
The disease denominated Rust, Red Rag, Red Robin, and
Red Gum, is caused by a fungus called Uredo rubigo. It
forms yellow and brown oval spots and blotches upon the
stem, leaves, and chaff. The spores burst through the epidermis and are dispersed as very minute grains. The disease
is common in corn and in grasses.
Mildew is a disease
caused by a fungus denominated Puccinia graminis. The
ripe spore-cases of this plant are small dark-brown clubshaped bodies, their thicker end being divided into two
chambers, each filled with minute spores, and their lower
end tapering into a fine stalk. The sori, or clusters of sporecases, burst through the epidermis sometimes in vast numbers.
The minute spores seem to enter the plant by the
stomata. Some think that they, as well as other minute
spores, are absorbed by the roots.
The disease attacks
wheat. Spring wheat is less liable to this disease than
winter wheat, and heavy soils are less subject to it than
light ones.
Many have supposed that the Barberry is in
some way connected with the production of Mildew. This
idea has been proved to be erroneous by the experiments of
Standinger, near Hamburg, and of Hornemann at Copenhagen.
Unger entertains the idea that blight, mildew, and smut are
to be considered as exanthematous diseases of plants caused
by the spores of Fungi entering the stomata.
" Henslow has shown by experiment that, if the diseased
seeds of wheat be steeped in a solution of sulphate of copper,
they will not produce diseased grain, and that the sulphate
of copper does no injury to their germination.
The solution
used is one ounce of sulphate of copper to a gallon of water
for every bushel of wheat.
Grain also steeped in hot water
does not reproduce these fungoid diseases. In East Lothian,
with the view of preventing smut, seed-wheat is often
steeped in stale urine, and afterwards some newly slaked
lime is sifted on it. Sometimes a solution of salt is used as
a pickle. FoUrcroy and Vauquelin ascertained by analyses
that blighted wheat contained an acrid oil, putrid gluten,
charcoal, phosphoric acid, phosphate of ammonia and magnesia, phosphate of lime, and no traces of starch.
As
regards Bunt or Pepper-Brand, Henslow remarks, that upon
simply immersing the grain in water the infected seeds float,
and on the water being poured out, nothing but the sound
ones remain in the vessel. This simple process of separation
is not however perfectly effective, because in thrashing the
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wheat many of the infected grains are crushed, and the spores are dispersed in the form of fine powder which adheres obstinately to the sound grain, by means of an oily or glutinous layer in which it is enveloped in the grain. In order to reach them thoroughly, it has been considered useful to add some alkaline key to the water in which they are washed. The alkali unites with the oil and forms a soapy matter. Lime has been used for this purpose, saponified potash, substances capable of saponification, and even lime-water have been employed; other matters, as sulphate of copper, act by destroying the vegetating power of the Fungi.

Mr. Ellis, of Barning, Kent, says that the irreversible process by which the wheat is attacked and whitened is accelerated by the addition of a very small quantity of alkali immersed in boiling water, and afterwards drying it with lime. The wheat placed in a colander or in a basket is immersed in boiling water for a few seconds, just long enough to wet it completely, it is then immediately dipped in cold water, afterwards dried with line, mixed with other wheat, and sown. By this means the wheat was always found to be cured of smut, while the vegetating principle was uninjured, great care being taken that the water was boiling, and that the wheat taken out of the water as soon as completely wetted. Mr. Ellis tried an experiment on a bushel of blackest wheat he could procure, which he divided into sixteen equal parts, sowing them all the same day, but with different treatment. The result at harvest was that the wheat not treated in this linear proportion produced not 100, while that dipped in boiling water and lined had not a black ear in several thousands which were examined. Many other species of Uredo as well as Ustilago give rise to diseases. They receive their names from the plant that is affected, the parts of the plant, and the colour of the disease, as is shown by the fact that the same species presents various forms according to the situation in which it grows. *Ustilago Maydis*, a maize smut, is a fungus which gives rise to prothecomes on different parts of the maize. The stem, upper leaves, and especially the bracts become immeasurably swollen when attacked by this disease, and the ovaries, anthers, and male blossoms are not exempt. The parts affected are at first white tinged with red, smooth and juicy. The cellular tissue increases in size, and is nourished by raising the mycelium and spores. The spores are twice as large in linear measure as those of the oat smut. At first the small balls contain a dark strong-smelling fluid, but ultimately the masses become dry, and present a quantity of dark dust mixed with irregular threads. *Ustilago vittata* causes disease in grasses in India. The spores of *Ustilago hypolytes* also cause disease in grasses. The spores are black and round, and the disease they occasion is denominated Oidium. There is no well-defined line of separation between the classes of Oidiums and the Fungi. A species of *Depeza* or *Septoria* sometimes produces disease in the knots of wheat. Various species of *Eurostilago*, *E. graminis*, *E. adunca*, and *E. biscria* give rise to kinds of mildew. Erysiphe is often met with in common pea crops. Some say that Oidiums are merely particular states of Erysiphe. The plant producing mildew in the rice is *Oidium Tuckeri* of Berkeley. Other species of Oidium probably cause mildew in the peach, rose, hop, pea, and onion. For destroying the mildew in vine sulphur is recommended to be dusted on them. Some also use a solution of hydro-sulphate of lime, made by boiling sulphur and lime in water. A fungus called *Rhizoctona Maii* is said to grow on the roots of apples, pears, and quinces, and to cause destruction to the trees. Ergot is a monstrous state of the grain, in which the enlarged and diseased ovary protrudes in a curved form resembling a cock's spur, hence the name from the French 'ergot,' meaning a spur. The ovary is black externally, spiny internally, and contains much oily matter. Some consider it as produced by the attack of a fungus, which causes the ovoid condition in the ovaries. The disease is usually met with in the grain, but the name of spurred rye is applied to it. It sometimes occurs in wheat and barley, and it has also been noticed in *Lotus perennis*, *L. arvensis*, *Poa acta praenitas*, *Phleum pratense*, *P. pratense* ssp. *hemilepidotum*, *P. pratense* ssp. *aureomarginatum*, *P. pratense* ssp. *arundinaceus*, and *Alopecurus agrestis*. Ergot consists of a very dense tissue formed by polygonal cells, united intimately with one another, and filled with an oily fluid. It is developed in the uninpregnated ovule of rye, for although extremely attacked by the entophyte and rendered difficult of recognition, the integuments of the ovule increase without completely losing the form which they would have assumed, if they had grown into a true grain, inititating in this respect the ovaries of wheat, in which *Tilletia caries* (Fries) has replaced the seed. The solid mass which has been called *Sclerotium clavus* by De Candolle, and the flamentous portion called *Sphaeria* by Leveillé and Féé, and *Eryotatia* by Queckett, are only, properly speaking, organs of vegetation. They are produced by imperfect spores, resembling an elegant Spharina, probably that called by Fries *Cordyigo purpurea*. This plant has been seen by Schumacher in diseased cereal grains, and it has been detected by Roussel in *Sclerotium piceum* and Calamagrostis, and by Durner in Ergot of Rye. Tulasne has shown that this Cordyigo is produced from the Ergot when it is allowed to vegetate. Ergot of Grasses and Ergot of *Cyperaceae*, according to Tulasne, do not belong to the same vegetable species. Rye, affected with this disease, when used as bread, is very prejudicial. The Abbé Testier showed that Ergot caused gangrene in animals that fed on it, and many instances are recorded of gangrene of the extremities occurring in persons who had lived on diseased rye. Ergot is said to prevail in rye grown on wet and stiff land.

"The disease which has recently attacked the Potato in various parts of the world is by many attributed to the attack of a fungus called *Erysiphes piceum* by Berkley, who describes the fungus as *Botrixia infestans*. The spores are supposed to enter the stomata and to cause disease in the leaves in the first instance, which afterwards extends to the tubers. The effects produced on the leaves resemble those of *Botrytis* in *Lettuce*. The fungus is a poisonous, toxic, and aciditious, such as hydrochloric, sulphuric, and nitric acids. Berkeley attributes the Potato disease entirely to *Fungi*. He states that the disease commenced in the leaves. They were attacked by the mold, which ran its course in a few hours; and from the rapidity with which it so far spread, the period for examination of the leaves had often passed over. The fungus generated does not live on decayed or decaying matter, but is one which produces decay, and renders the plants unmarketable; and it has been shown that it is the prevention of the elaboration of the sap in the leaves, obstructing the admission of air and the emission of transpirated fluids. The stem is thus overcharged with moisture, and ultimately rots, while every source of nutrition is cut off from the half-ripe tubers. The atmospheric conditions during the late disease made the fungus spread rapidly.

"While there is no doubt that the *Botrixia* is developed in the progress of the Potato disease, the question arises whether or not it is the originating force, or whether it is to be set down as the phenomena, that changes are induced in the cells of the potato by cultivation which render the leaves liable to disease. Atmospheric influences are thus enabled to act upon them, so as to cause alterations of internal function. This influences the *Botrixia*, accelerates the morbid action, and causes it to assume a peculiar form. In this way high cultivation, atmospheric influences, and *Fungi* all contribute to cause disease. In the Potato disease of 1846, Hartig says that brown granular matter was deposited in the cells, first in those near the epidermis, then the cellular walls lost their transparency, and the cells could no longer be isolated by boiling water; next the cell-wall was destroyed, and small cavities were formed in the midst of the tissues, in which were agglomerated grains of starch, and finally parasitic organisms appeared in the cavities. The vegetable parasites developed were *Polyactis alba*, *Fusisporium solani*, *F. candidissimum*, *F. candidissimus*, and *Ergotum violaceum*. When the disease had advanced insects were also present."

"Crum attributed the disease of the tubers of the Potato to rupture of the starch cells, and mixture of their contents with nitrogenous matter, thus causing fermentation, as in the apple and grape. Solly objects to the fungus theory, and says that this matter is necessary for the growth of *Fungi*. He thinks that the disease is caused by the presence of putrefying animal matter in the stem, just below the surface of the soil, that this has suffused the different conditions between vital and chemical forces, and induces decomposition by a process of fermentation. The asoiled matter, in a condition to act as ferment, is produced by the state of the season, by deficiency of light, and by other meteorological causes. Analyses show that the constituents of the diseased
potato undergo a rapid and important change. Dr. Lyon Playfair and Mr. Phillips found that the amount of albumen and gisten decreased from 8:24 in the sound potato to 92 in the diseased; and when the disease advanced they finally disappeared.

Mitscherlich says that the change which cellulose undergoes by the action of a peculiar ferment is characteristic of the same nature. The destroying agent is obtained when half putrid potatoes cut up into small pieces, are immersed in water, and fresh potatoes, cut in slices, added to it; when these are decomposed, a portion of the liquid may be treated with water, and more slices of potato added, which soon become decomposed, and in this manner increase the activity of the liquid. Hence, just as in the fermentation of an infusion of malt, the yeast, the fermentative fungus, becomes augmented, so does the ferment increase. It only acts upon the cellulose, which forms the walls of the starch-cells of the potato; first the cells separate from each other, so that ammons us with a convenient means of obtaining the cells with their contents in an isolated state, and facilitating their examination; the walls of the cells are subsequently also dissolved, and the starch-particles fall out: in this manner, in 24 hours, a solution is obtained, which can be used in the same manner as we have just described. In this case, that portion can be removed by a pair of forceps, the hard mass of the potato lying beneath the softened layer, so that this process takes place successively from the outside towards the interior, not by the whole of the potato being used, but by taking up the most external portion. Exactly the same process as that which we can produce spontaneously, he says, occurs in the Potato disease, which during late years has done so much mischief. In consequence of the death of the state, is decomposed; and the liquid, which the Author had kept for a long time in contact with one of the diseased potatoes, immediately produced the decomposition of a sound one. This decomposition is, therefore, he says, not the disease itself, but merely a consequence of the dying or the previous death of the entire plant, and just as it is well known in the case of other plants that they die when the apices of their roots are too strongly cooled, so may a sudden cold rain following a long warm winter produce a similar condition of the potato plant. It is only after decay has commenced that Fungi and insects attack the plant.

Lieber attributed the Potato disease to diminished or suppressed transpiration, depending upon the hygroscopic state of the surrounding air. This intoxicating property, he said, in regard to the Hop hight, in which the disease is traced to the want of correspondence between absorption and transpiration, and a consequent stagnation and decomposition of the juices. The same thing, he thinks, takes place in the case of the potatoes, which are loaded with moisture; and he shows that in 1845 and 1846, when the disease overran Europe, damp, cold, and rainy weather followed heat and drought just at the period of the most luxuriant growth of the potato. The vessels and cells became charged with fluids; and, owing to the depressed transpiration, there was stagnation of the sap and death.

Fungi and putrefaction are, according to him, the consequences of the death of the plant. Klotzsch proposes to check the Potato disease by planting off the extremity points of the branches and twigs to the extent of half an inch downwards when the plants have attained the height of six or nine inches above the soil, and to repeat this on every branch or twig on the tenth or the eleventh week. This check to the stem and branches, he thinks, will direct the nutrient matters in the direction of the increase and multiplication of subterrestrial as well as aerial branches. This leads to increased development of tuber, and strengthens the leaves and stalks. Tonnelle, Lomba, of Namur, says that he has noticed that the disease begins by the leaves after flowering with a very sharp sickle, and then covering the ground with earth to the depth of not less than an inch and a half. The top dressing thus applied was not disturbed till the plant had grown, in which case the leaves withered being cut. It is said that the tubers acquired a good size and were of excellent quality. If these facts are true, it would appear that, while leaves are necessary to the development of tubers, the latter on acquiring a certain size can continue their growth by their own proper and unassisted vitality. The general conclusions to be drawn from all that has been said relative to the Potato disease are, that changes are induced in the cells and vessels of the potato by certain obscure meteorological and epidemic causes; that an alteration takes place in the cellulose and in the contents of the cells, which specifically leads to decay; that parasitic Fungi find a nidus in the decaying organic matter, so as to accelerate and give a character to the disease; and that, as yet, no remedy has been devised for its suppression.

For an account of the Fungi supposed to produce Dry-Rot in timber see the article Dry-Rot.

In many parts of the world the Fungi afford a supply of food to the appetite of man. Although only a dozen species are to be found in the markets of London, and only the common Mushroom, Truffle, and Morel are eaten in Paris; in Italy and other parts of Europe, a large number of species are consumed. [Abercrombe.] Dr. Basham, in his work on the "Excellent Fungi of England," gives descriptions and drawings of the following species of British Fungi as which may be used as food:—


To great caution however cannot be employed in distinguishing the edible from the poisonous species. In the markets of Rome an Inspector of Fungi is appointed, in whose duty it is to examine the products offered for sale, and none are allowed to be sold but with his express sanction. But it would appear, from a case quoted in Lindley's 'Vegetable Kingdom,' that Fungi which are usually innocuous may, under certain circumstances, become poisonous. The instance of a fungus common in this country, which after years shone with silver was the Agaricus perenatus, a species sold in Covent Garden under the name of Bliewitt, and which all writers agree in regarding as perfectly safe from danger. The poisonous principles produced in the Fungi have sometimes been employed in medicine, one instance of which is given above in the Ergot. The action of a species of Bovista has been found similar to that of chloroform. [Bovista, S. 1.] The Amanita muscaria possesses an intoxicating property, which is employed by northern nations as an inebriant. The following is the account of Langeron, as given by Dr. Greville:—

'This variety of Amanita muscaria is used by the inhabitants of the north-eastern parts of Asia in the same manner as Morina, arachis and other plants of the same nature. Such Fungi are found most plentifully about Wischus, Kamchatka, and Willowa Dereesa, and are very abundant in some seasons and scarce in others. They are collected in the hottest months, and hung up by a string to dry in the air; some dry of themselves on the ground, and are said to be far more narcotic than those artificially preserved. Small deep-colored specimens thickly covered with warts are also said to be more powerful than those of a larger size. And a colonel, who was asked to take the fungus to roll it up like a bolus and swallow it without chewing, which the Kamchatkadales say would disorder the stomach. It is sometimes eaten fresh in soups and sauces, and then loses much of its intoxicating property. When steeped in the juice of the berries of Vaccinium uliginosum its effects are those of a strong wine. One large or small two Fungi are a common dose to produce a pleasant intoxication for a whole day, particularly if water and a little drunk and filtered. To sum up the Japanese narcotic principle. The desired effect comes on from one to two hours after taking the fungus. Giddiness and drunkenness result in the same manner as from wine or spirits: cheerful emotions of the mind are first produced, the countenance becomes flushed, and the whole body throws off at last an entire loss of consciousness. It renders some remarkably active, and proves highly stimulating to muscular exertion. By too large a dose violent spasmodic effects are produced. So very exciting to the nervous system in many individuals is this fungus that the effects are often very
ludicrous. If a person under its influence wishes to step over a straw or a small stick, he takes a stride or a jump sufficient to bring the foot of a tree cannot keep silence or secrets, and one fond of music is perpetually singing. The most singular effect of the *Amanita* is the influence it possesses over the urine. It is said that from time immemorial the inhabitants have known that the fungus imparts an intoxicating quality to that secretion, which continues for a considerable time after taking it. For instance, a man moderately intoxicated to-day will by the morning have slept himself sober, but (as is the custom) by taking a tea-cup of his urine he will be more powerfully affected. On the preceding days, therefore, it is certainly not uncommon for confirmed drunkards to preserve their urine as a precious liquor against a scarcity of the fungus. The intoxicating property of the urine is certainly not being propagated, for everyone who partakes of it, has his urine similarly affected. Thus, with a very few *Amanita* a party of drunkards may keep up their debauch for a week. Dr. Langendorf mentions that, by means of the second person taking the urine of the first, the third of the second, and so on, the intoxication may be propagated through five individuals."

*Fungi* are often phosphorescent. The light given out by species of *Rhizomorpha* in the coal-mines of Dresden is described as giving them the appearance of an enchanted castle. *Amanites* are found growing on the streets of Britania in Brazil, is highly luminous. The same phenomenon has been observed in *A. olearius* in the south of Europe, and in two species of *Fungi* at Swau River. Dr. Hooker describes lycopodium growing upon decaying wood in the forests of the Sikkim Himalayas.

It is generally stated that *Fungi* differ from the rest of the vegetable kingdom, in the absorption of oxygen and the discharge of carbonic acid gas. In experiments which have been performed, it has been found that it is well known that the tissues of *Fungi* are easily decomposable, and it is more probable that the absorption of oxygen, and the giving out of carbonic acid gas is the result of decay, rather than of the true growth of the plant. The following substances are decomposed by *Fungi* in the following order:


The natural connection of the germination of the fungus with the development of *Fungi* is the occurrence of vegetable cells, referred to this order, in liquids undergoing fermentation. During the conversion of malt into beer, plant-cells are constantly observed to be present, and these have been described as a plant, under the name of *Fusel-organism*. They are prepared by a liquid known as flax, as now carried on at Belfast, Professor Allman has observed present cells resembling those of *Saccharomyces*. Whether these are true plant-cells or not, is still a question; and it is still more a question as to whether they have anything to do with the changes going on in the solutions in which they occur. They are probably a result, and not the cause, of fermentation. These cells have not escaped the observation of Schleiden, and the following is his account of them:

"In the last place, I must mention a highly interesting analogy, which, when more accurately examined, may perhaps one day lead to the most satisfactory explanation of the process of cell-formation—I mean vinous fermentation. We have seen that the sugar which passes into dry, and a nitrogenous matter, as a cytoplasm, are present. At a certain temperature, which is perhaps necessary to the chemical activity of the nucor, there originate, without, as it appears, the influences of the living plant, a process of cell-formation (the origin of the child being procured), and it appears that it is only the vegetation of these cells which produces the peculiar changes that occur in the fluid. Whether this organism is really a fungus, is a matter of individual opinion. But, through the activity of its vital processes, determines the process of fermentation, deserves to be accurately determined."

I will here add my own observations on these fermentations, as follows: I bruised some currants with sugar, and having pressed the juice through a cloth diluted it with water and filtered through folded paper. The fluid was bright red, quite clear and transparent, and, under the microscope, shows fermentation vapours, but possesses a number of drops of a pure clear oil. At the end of twenty-four hours the whole fluid was opalescent, and presented, under the microscope, a number of granules suspended in it. On the second day these granules had greatly increased, and there appeared amongst them perfectly-formed ferment-cells. There also appeared, now and then, vesicles of carboxylic acid gas. On the fourth day fermentation was very active. At the bottom of the vessel and on the surface of the fluid, yeast had formed; but these yeasts consisted of single cells, or occasionally in short chains, so that it was not the slightest possibility that the view could be observed the way in which one cell was formed from another. The ferment-cells do not in this state permit of a distinction between the contents and the membrane of the cell. In the midst of the cell there is a transparent spot, but whether hollow, or a solid nucleus, I could not decide.

The remaining parts appeared entirely homogenous, yellowish like a nitrogenous substance, sometimes mixed with small solitary granules. In a similar way, a solution of sugar with water was examined, and similar results. Other results were obtained in the following way:—Pare white protein (albumen) from the white of an egg, was dried, and rubbed down with sugar, and left to ferment: the fluid at first was perfectly clear. On the third day, the small portions of albumen, and the sugar, were heated together, in a vessel of glass, to a sharply angular aspect, assumed partly a granular aspect, and some a more or less rounded form. These globules showed an active molecular motion, and some appeared strangely together. On the fourth day they had taken the shape of spheroidal cells, which were either solitary, or arranged together in a line with a tendency to the formation of branched fibres. These cells were not more than one-third of the diameter of ordinary ferment-cells. An active fermentation was exhibited. The globules were given out from the protein-granules and the linear cells. Proper ferment-cells did not make their appearance. Fluid albumen, mixed with sugar, and filtered, became thickened on the second day, and contained little granules of albumen, as well as sugar, and these globules resembled that exhibited by the preceding, except that there were developed a few true ferment-cells. Protein moistened with water displayed the same appearances as when mixed with sugar and water; ultimately putrefaction came on, and the development of *Infusoria*, and the vestiges of the vegetable, was given out a large round flat body (a cytoplast)!

The following arrangement of the *Fungi* is given in Lindley's 'Vegetable Kingdom':—

<table>
<thead>
<tr>
<th>Hyphomycetes</th>
<th>Acrocarpes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasteromycetes</td>
<td><em>Aurzeciaceae</em>.</td>
</tr>
<tr>
<td>Coniothyriomycetes</td>
<td><em>Uranothecaceae</em>.</td>
</tr>
<tr>
<td>Coniales</td>
<td><em>Hyphomycetes</em>.</td>
</tr>
<tr>
<td>Coniales</td>
<td><em>Botsyllaceae</em>.</td>
</tr>
<tr>
<td>Coniales</td>
<td><em>Ascomycetes</em>.</td>
</tr>
<tr>
<td>Coniales</td>
<td><em>Hel believingaceae</em>.</td>
</tr>
<tr>
<td><em>Pycomycetes</em>.</td>
<td><em>Mucoraceae</em>.</td>
</tr>
</tbody>
</table>


GADELENTZ. [Elzach.]

GADBURY, [Duckw.]

GARTNER, or GÄRTNER, FRIEDRICH VON, architect, was born at Cobleslow in 1799, and was the son of Johann Andreas Gartner. Brought to Munich at an early age, he received his general scientific education, and in 1809 entered the Academy of Arts in order to devote himself specially to architecture. After three years he went to Paris to enter the Academy there; and here he enlarged his knowledge under the guidance of Perder. France had been during many years regarded as the school of Germany in art; for German art was then only about to reassert independent character, such as under Gärtnor and other artists it soon acquired. In 1814 Gärtnor went to Italy, where he remained four years. He visited Rome, Naples, and other places of general interest, but would appear to have devoted himself to the antique monuments as much as to later works, although it is the character of the Byzantine and early Italian styles to which the designs in his own buildings are most closely allied. He specially studied the ruins in Sicily, including those at Garegnos, Segesta, and Taormina, which he drew and published in lithography, in 1819, in a work entitled "Views of the best-preserved Greek Monuments of Sicily, with Explanatory Text." In 1819 also he came to England, and was engaged in connexion with the restoration here; but in 1812, when seeing the restoration of the Munich Academy, he was from that time engaged in Bavaria. Well qualified by his studies and taste to co-operate in the great revival fostered by the Crown Prince (afterwards Louis of Bavaria), Gärtnor became connected with several important branches of manufacture. The superiority in form and character attained in the works of the porcelain factory, of which he became director in 1822, was due to him, as also in great part was the revival of glass-painting. In 1820 the elevation of his character was at its height; and in the same year he was appointed to the post of architect at Regensburg. In 1825 he commenced the Blinden-Institut. Amongst his other buildings at the same time, or subsequently, were the University, the Erziehungshaus, the Domstift, the Priester-Seminar, the Salzamt, the Ludwiger-thor, and the Feldmarener-Bezirke, all in Munich; the church of St. Michael, in Wittenbach, the pump-room at Kissingen, and the Befreiungsstalle at Kelheim—a great monument in the form of a ruin, designed to commemorate the liberation of Germany. In 1836 Gärtnor accompanied the king to Athens to study its monuments and there remained three years. He was appointed the first Resident, or palace, for King Otho. At Athens he re-opened the quarries of Pentelic marble, said to have been forgotten since the time of Hadrian. On his return he was appointed oberbaeherr, or architect to the court, and received the order of Civil Merit of the Crown of Bavaria; and on the departure of Cornelius for Berlin in 1841, he was made Director of the Academy of Arts. In addition to the works there mentioned, Gärtnor was architect of the Pompejan Hause at Aschaffenburg—one of those efforts to collect a series of examples of style, through which, in consequence of that aim, the value of King Louis's still great services to art was rediscovered. Gärtnor also restored the luthor, and portions of the cathedrals at Regensburg and Bamberg. He died on 21st of April, 1847, aged fifty-five years.

Gärtnor's style, as described by Raccnynk ("Histoire de l'Art Moderne eu Allemagne"), is one which "recalls the idea of the Byzantine; which, as a general statement, is correct. The University and the Bibliothek have here a curve order of design, and there is an intercolumniation in the arch-headed window, divided into two lights by a column, and avoids the characteristics of the late Italian styles,—while ornament of original character is freely introduced, and there is a tendency to think of Munich for interior design in buildings, and the influence of which has spread even to this country, is due to Gärtnor. A publication of his designs was commenced about 1844 or 1845.
to impart the method to any one person intending to become a

Thus baffled, Gallaudet was compelled to try Paris. Here he met from the Abbé Sicard a warm welcome. Everything was ready for the opening of his school, and every means that could be devised was used to accelerate his acquisition of the desired knowledge. He was able to return to America before the close of 1816, and the Abbé Sicard cheerfully consented to let him have the notes which had been left behind of the pupils, and was then one of the most valued teachers of the institution (he had indeed already been designated its "glory and support"), accompanying him to America. During his absence in Europe, the society had been incorporated; Mr. Gallaudet was appointed the first president, and Le Clerc being his head assistant, on the 16th of April, 1817, "The American Asylum for the Deaf and Dumb," at Hartford, Connecticut, was formally opened.

Mr. Gallaudet took the life of the asylum up to 1830, when he resigned from failing health. His devotion to his duties had been most exemplary, and his success as a teacher, we are told, was "uniform and pre-eminent." The system which he in conjunction with M. le Clerc ultimately established, and which has been adopted in the other asylums (of which there are now fourteen) in the United States, was founded on that of the Abbé Sicard, but with very considerable modifications. It is known as the American system. The main principle with Mr. Gallaudet was to confine himself to a small number of pupils, and even in the few that he had under his charge, being able, by exercising him in describing things for himself, and to discourage the mere learning by rote; and the result was to stimulate the mind of the teacher, as well as of the pupil, in no small degree.

Mr. Gallaudet's exertions were by no means confined to the deaf and dumb asylum. He took an ardent and active interest in the improvement and extension of common schools, and in the raising up of a superior body of teachers, and wrote several pamphlets on the subject. He also strongly advocated the adoption of means of imparting moral and religious training to prisoners; and he was an earnest promoter of the movement for improving the management of the insane. So strongly did he feel on this matter that, though in bad health, he accepted in 1830 the office of chaplain of the State "Retreat for the Insane," at Hartford; where it is stated, "the experience of each successive year has given an increasing usefulness of the usefulness of his labours, and the efficacy of kind moral treatment, and a wise religious influence in the reformation and care of the insane."

He died on the 10th of September, 1851. About twelve months before his death, the good old man, and his colleague M. le Clerc, had the gratification of receiving from the deaconesses of the asylum a silver plate as a testimonial of their gratitude for the many years of service of plate each; and on the death of Gallaudet, his fellow-citizens proposed to erect a monument to his memory, as a mark of their sense of his services; but as soon as their intentions were known, the deaconesses urged that the superior claim to the performance of that duty, and accordingly a handsome and costly monument was erected to his memory at Hartford, at the "sole expense of the deaf-mutes of the United States," the designer and architect of the monument being both deaf and dumb persons.

The publications of Mr. Gallaudet are numerous, but chiefly pamphlets on the education of the deaf and dumb, and on other educational matters; lesson books; and articles in educational periodicals. He also published a volume of sermons, and some books for the young, one of which, "The Child's Book of the Soul," had an extended popularity both in America and in England, and was translated into French, Spanish, Italian, and German.

(Margard, Tribute to Gallaudet, 8vo, Hartford, U.S., 1852.)

GALLE, POINT DE, a town, fort, and harbor on the south coast of the island of Ceylon, 73 miles S. by E. from Colombo, is situated in 6° 1' N., lat., 80° 16' E. long. The site is a beach, and fort was given by a low rocky promontory named the Point de Galle. The harbor, which is the largest point, which extends towards the east, and a piece of land sloping inwards from the west, thus forming a small bay. The entrance to the bay is about a mile wide, but as there are many dangers; viz., rocks and sand-banks, and the risk of the anchorage, which is-although the town in 5 fathoms depth of water. There is a pier; a jetty was constructed in 1847, and a new wharf in 1853. The increase in the number of steam-steamers calling at the port chiefly to take in coal has caused various proposals to be made for improving the harbor, but funds are wanting. The fort, built by the Dutch, is upwards of a mile in circumference, and contains several large and commodious houses inhabited by Europeans. The town, or petlah, inhabited by natives, is extensive, contains many fine houses, and is surrounded by a wall. The schools here maintained by the government for the education of the natives. An iron lighthouse, constructed in London, was erected in 1846; the total height of the light above the sea-level is about 130 feet; the range of its rays is 15 miles, and the letters, d.c., are forwarded immediately to Colombo, whence they are transmitted to all parts of Ceylon. Letters taken by steamers from Point de Galle reach Madras in three days and Calcutta in nine days. Bombay is reached by steamer in 21 days.

GALLOWELLIA [MELSSONIE, S. 2]

GAMBIA COLONY, the British settlements on the Gambia, a river in Western Africa. The source of the Gambia has not been definitely ascertained. According to the most reliable accounts it rises in the country of the Fouta-Jalon, very near and a little to the south of the source of the Rio-Grande, in 10° 36' N. lat., 11° 18' W. long., in a valley surrounded by mountains. The river flows first east and then north till it reaches 12° 25' N. lat., where it turns and flows south to 11° 18' N. lat., where, after having flowed upwards of 400 miles, it is less than 50 miles from its source. Its course is then generally north-west as far as 14° 30' N. lat., 12° 18' W. long, whence it flows westward with many meanders, and then south, and lastly north again, and continues during a course of 600 miles, until it reaches the Atlantic. The Gambia has many affluents, especially in the upper part of its course. The most remarkable on the right bank are the Ra Creek, the Neclabany, the Nyariro, the Nyan-chor, Kaur, Porf, the Jelata, and the Erupina, 45 miles below which the Gambia throws off a considerable branch named the Casmanas, which by numerous channels flows into the St. Domingo. The width between Cape St. Marie and the island of Sangomar is about 25 miles.

The Gambia has been regarded in the past as being of little importance, but it has now been found to be one of the most promising among the African territories as a source of wealth and trade. The trade of the colony has increased upwards of 150 per cent on the value of 1810; and the revenue of the colony has increased from 49,250/. in 1810 to 186,404/, of the imports to 107,011/ in 1852. The exports amounted to 187,556l., the imports to 110,174. The number of vessels arriving at the colony during 1852 was 256, 30,376, of which 31 ships of 2,507 tons were British. The number and tonnage of ships cleared outwards during 1852 were:—Ships 260, tonnage 30,188, of which 30 ships of 4,994 tons were British. The number and tonnage of vessels registered as belonging to the port of Bathurst increased from 24,670 in 1845, to 24,850 in 1852, the principal export in that year being ivory, the quantity being 2,923; above 50 tons 14 vessels, tonnage 1270. Of the amount of exports for 1851 (186,404l.) the article of ground-nuts alone furnished 133,133¢l. value. The quantity of ground-nuts exported in 1850 was 1,500 tons; in 1851 it was 2,500 tons; in 1852 it has risen from 47 tons in 1836, to 11,094 tons in 1851. The ground-nuts are chiefly exported to France. The increased demand for this produce has tended to encourage settled and industrious habits among the native African population, many
of whom travel hundreds of miles from the interior, and hire from the chiefs whose lands lie on the banks of the Gambia, such small portions of ground as their circumstances allow them to cultivate. After the produce of two or three years has enabled them to purchase supplies of European goods, they usually make up parties of from 20 to 100 strong and return to their homes in the interior. These migratory labourers are called 'tillehunks,' or men from the east. The principal establishments of the Gambia Colony are at Bathurst, on the island of St. Mary, the chief river, whence the produce of the country is shipped for England, and at MacCarthy's Island. A colonial steamer has been stationed at Bathurst for some years, and has been of considerable assistance in facilitating communication with MacCarthy's Island, and with trading stations on the banks of the Gambia. The land and sea breezes blow regularly over St. Mary Island for a considerable part of the year. The surface is a low plain with a slight descent on the north and east towards the centre, which during the rainy season is much inundated. The soil is sandy, with a very small admixture of loam. In the shade the thermometer does not rise above 90°. Water is scarce and not of good quality. Bathurst town does not stand upon the curing of river, a mile above, a high, a water-market, and is good and substantial government and public buildings have been erected, as well as numerous handsome and convenient warehouses and dwellings; the remainder of the houses are rude and made of mud. The immediate trade of the island is with about 50, but the number of European and American sailors and others visiting Bathurst every year is little short of 1200. There is a Roman Catholic chapel, capable of accommodating 600 persons, but no suitable place of worship for Protestants. The latter, by and for any time longer than 24 miles in length, and stretches along the shore of the Atlantic, with an elevation above the sea varying from 60 to 90 feet. It is situated near Cape St. Mary, and being intended to be built upon by merchant and others, residents of Bathurst, it has been called Giffen.

The population of Gambia Colony, according to the census taken March 31st 1851 was 6963, as follows, namely:

<table>
<thead>
<tr>
<th>Colour of Population</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Island of St. Mary</td>
<td>167</td>
<td>13</td>
<td>180</td>
</tr>
<tr>
<td>MacCarthy's Island</td>
<td>8</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Barra Point</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Cape St. Mary</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>177</td>
<td>14</td>
<td>191</td>
</tr>
</tbody>
</table>

Of the total population 82 were returned as engaged in agriculture, 330 in manufactures, and 278 in commerce.

MacCarthy's Island, the Janjan Bays of the natives, has an area of about 3 square miles, and is 180 miles from the mouth of the river, following its windings, in a populous district, 60 miles below the falls of Baracundu, np to which spot the river is navigable for vessels of 100 tons burden. Fort George, on the island, is in 15° 29' 25' lat., & 15° 46' W. long. or 20c. 46' 70, and is about 11 miles above the level of the sea, and both are in a great measure covered with water during the rainy season. Tropical remittent fever occurs at both places, but with most intensity at MacCarthy's Island. MacCarthy's Island has a rich alluvial soil, which in the dry season becomes a mass of burnt clay. The thermometer frequently rises to 106° or 108° in the shade.

The Wesleyan Methodists have schools at Bathurst, at MacCarthy's Island, and at Barra opposite Bathurst; the total number of boys and girls attending is no less than 50, and there have a school at Bathurst under the care of several Sisters of Charity.

GAME LAWS. Hares are no longer game, in the sense of its being necessary to take out a certificate to kill them (11 & 12 Vict. c. 29).

GAMING. The numerous alterations which have been made in the law relating to contracts by way of gaming, to gambling-houses, and to betting-offices, call for some repetition of what has been already stated on this subject. (Gaming.) Playing at cards, dice, or other games of chance, merely for recreation, and without any view to inordinate gain, is by the common law considered perfectly innocent. Not so the offence of gaming: which the law looks upon as a tacit confession that the company engaged therein do, in general, exceed the bounds of their respective fortunes; and therefore they cast lots to determine upon whom the ruin shall at present fall, that the rest may be saved a little longer. In this light, it is an offence of the greatest malignity, and the necessary consequence to promote public idleness, theft, and debauchery, among those of a lower class: and among persons of a superior rank, it has frequently been attended with the sudden collapse of ancient and opulent families, an abandoned prostitution of the principal of family and virtue, and too often has ended in self-murder. To restrain this pernicious vice among the inferior sort of people, the statute of 33 Hen. VIII. c. 9, was made; which prohibited all but gentlewomen the games of tennis, tables, cards, dice, bowls, and other unlawful diversions, such as lodging in the fields, slide-thrift, or above-groat, cloysh-cayls, half-bowl, and cotingy, unless in the time of Christmas, under punicanty pains and imprisonments. By the statute 16 Car. II. c. 7, it was enacted, that no gambling or betting lost more than 100l. at one time, he was not compelled to pay the same; and the winner forfeited treble the value, one moiety to the king, the other to the informer. By the statute 12 Geo. II. c. 14, further provided, that all bonds and other securities, given for money lent at the time to play withal, should be utterly void; that all mortgages upon the same consideration, should enure to the use of the heir of the mortgagee; that, if any person at the time of the loan should cry 'stop,' he should forfeit five times the value to any person who used for it, and (in case of cheating) should be deemed infamous, and suffer such corporal punishment as in case of wilful perjury.

The effect of these, and various other statutory provisions, which need not be enumerated, was that all gambling securities, even when transferred to purchasers for a valuable consideration, and without notice of their illegal origin, were altogether void; a result under such circumstances often attended with great hardship and injustice. The law was, however, remedied by the statute 3 Geo. IV. c. 41, by which securities given for considerations arising out of illegal transactions are declared not to be void; but to be deemed as having been given for an illegal consideration only, the object and consideration having been the treble of the principal of such securities. Finally, by the statute 8 & 9 Vict. c. 106, repealing the Act of Hen. VIII. (so far as relates to the prohibition of the games of skill therein mentioned, together with the statutes of Charles II. and Anne, and several others), every person who by any fraud, unlawful device, or ill practice, in playing at or with cards, dice, tables, or other game, or in bearing a part in the stakes, wagers, or adventures, or in betting on the sides or hands of those that play, or in wagering on the event of any game, shall forfeit, p专辑, all of the share of the same, and any sum of money or valuable thing, is guilty of obtaining it by a false pretence, with intent to cheat or defraud; and being convicted thereof, is punishable accordingly. By the same statute all contracts or agreements, by which any sum of money or valuable thing, are declared to be null and void, and no suit is to be maintainable for recovering any money or valuable thing alleged to have been won upon any wager, or deposited in the hands of a stakeholder. This provision, however, does not apply to any money subscribed or contributed for or toward any plate, prize, or sum of money to be awarded to the winner of any lawful game (such as a foot-race or dominoes), sport, pastime, or exercise.

For the suppression of gaming-houses, many statutes have been passed from time to time. The Act 33 Hen. VIII. c. 9, first prohibited the keeping of any gaming-house for profit, under a penalty of 40l. a-day; and subjected any person
hanging and using such gaming-houses to a penalty of 60, 80l. The same statute, and also the statute 30 Geo. II. c. 24, inflicted penalties as well upon the master of a public-house, wherein servants were permitted to game, as upon the servants themselves, who were found to be gaming there. Special provisions for the prevention of this offence were afterwards made by the statute 3 Geo. IV. c. 61, the unlawfully and knowingly permitting of any unlawful game, or any gaming whatever, in a public-house, may involve a forfeiture of the licence as well as a fine, and a licence not also required under a penalty, to be obtained annually, at the general annual licensing meeting of the justices of the peace, by such persons as keep public billiard-tables and bagatelle-boards, or instruments used in any game of a like kind.

The general principle of the reign of George II. was, all private lotteries by tickets, cards, or dice (and particularly the games of faro, basset, ace of hearts, hazard, passage, roolly-polly, and all other games with dice, except back-gammon), are prohibited under a penalty of 200l. for him that shall erect such lotteries, and 50l. a time for the players; and by the statute 42 Geo. III. c. 119, games called little-gets are declared to be common and public nuisances, and a penalty of 500l. is imposed on persons keeping any office or place for the sale of, or for the conducting of any lottery whatsoever, not regularly by public lottery.

Public lotteries, as we have already seen, under the denomination of Parliaments, and all manner of ingenuous devices, under the denomination of sales or otherwise, which in the end were equivalent to lotteries, had been before prohibited by a great variety of petty penalties.

The effect of these statutes being to render all lotteries illegal, whatever might be the object, it was found necessary to pass a special Act for the protection of those laudable associations, generally called Art-Unions, having for their object the promotion of particular arts, and required, accordingly, by the 9 & 10 Vict. c. 48, any voluntary association constituted for the distribution of works of art by lot, is to be deemed legal; provided it be incorporated by charter or by deed constituting the association and its rules be submitted to and approved of by a committee of the Privy Council.

The statute 13 Geo. II. c. 16, to prevent the multiplication of horse-races, another fund of gaming, directed that no plates or matches under 50l. value should be run, upon penalty of 200l. to be paid by the owner of each horse running, and 100l. by such as advertised the plate. But in consequence of a number of vexatious actions having been brought under this statute, it was, so far as it related to horse-racing, repealed by the statute 16 Geo. II. c. 119. The last clause of the section, viz. that the provisions of the statutes 33 H. VIII. c. 9, and 13 Geo. II. c. 19, and of the exception before mentioned in the statutes 8 & 9 Vict. c. 109, is to place all bags relating to horse-racing under the same laws as other bags.

"But," as observed by Blackstone, "particular descriptions will ever be lame and defective, unless all games of mere chance are at once prohibited; the inventions of sharpers being swifter than the punishment of the law, which only hunts them from one device to another." Such contracts as to horse-racing legalised, than an immense number of petty gaming-houses sprung up, under the name of betting-offices. The demoralisation which was found to be the immediate result called for the interference of the legislature, and the statute 16 Geo. II. c. 119, was accordingly passed, expressly for the suppression of these haunts of vice.

Under this Act, the owner or occupier, or any person using such places, may be summarily convicted, and either punished by a fine of 500l. or imprisonment with or without hard labour, for any period not exceeding 14 years. Persons receiving deposits on bets in such houses incur a penalty of 50l., or three months' imprisonment with or without hard labour, for the exhibition of placards or bands-bills, or the display of any sign or other device, under a penalty of 50l., or two months' imprisonment; and summary particulars are conferred on magistrates and constables to enter and search suspected houses.

This only added here, that a bet is not entitled to a certificate, or the certificate if granted is void, if he has lost 20l. in one day or 500l. a year by any sort of gaming or wagering.

**Common gaming-houses are public nuisances,** and the keeper thereof is guilty of an indictable offence. To encourage the prosecution of such pernicious establishments, the statute 30 Geo. II. c. 36, as amended by 58 Geo. III. c. 70, imposes on the overseers of the parish, or the constable, the duty of prosecuting, whenever two rated inhabitants depose before a magistrate to their belief of the fact of the house being a gaming-house, and enter into recognizances to give evidence thereof. The costs of the prosecution are, in this case, allowed out of the rates. In the construction, the two inhabitants who originated the proceeding to be entitled to each 10s. To facilitate such prosecutions, it is expressly provided that the person appearing as acting as master, or as having the care and management of any gaming-house, shall be deemed to have the whole of the house in his keeping, and the offence is punishable by a fine, to which, by the statute 3 Geo. IV. c. 114, imprisonment and hard labour may be added.

The more recent enactments of the statute 8 & 9 Vict. c. 16, and 17 & 18 Vict. c. 93, have still further facilitated the prosecution of this offence. The owner, occupier, or keeper, and every person in any manner conducting the business of any common gaming-house, or advancing or furnishing money for the purpose of gaming, may now be convicted on the oath of one witness, before two justices of the peace; and in addition to the penalties of the Act of Henry the Eighth, be fined in any sum not exceeding 5000l., or in the discretion of the justices, be committed to the house of correction, with or without hard labour, for any period not exceeding 14 years or months. No proceeding under these statutes is a bar to an indictment being preferred; but no person summarily convicted under them can afterwards be proceeded against by indictment for the same offence. To remove any doubts that may have arisen as to the effect of the aforesaid Acts, and other Acts mentioned, the statute expressly provides that any person examined as a witness, either before the justices or on the trial of any indictment or information touching any unlawful gaming, and who shall receive from the court a certificate of his examination or trial, shall be able to prove, in any criminal prosecution, forfeitures, and disabilities in respect of such unlawful gaming, while the second statute expressly enables the justices to require persons apprehended in gaming-houses to appear before them.

Facilities are given by these statutes for entering forcibly houses and rooms suspected to be used as places for gaming; and for the arrest of persons found there; heavy penalties are imposed on persons obstructing the entry of constables, and the fact of such obstruction being itself a felony.

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GARNISHER. When he had done with it, the judgment debtor is attached to answer the claim of the judgment creditor [ATTACHMENT; ATTACHMENT OF DEBTORS, § 2], the judgment debtor is called the Garnishee, a designation derived from the French garnir (to garnish). The Lord Mayor’s Court of London, the Tolsby Court of Bristol, and the Borough Court of Exeter. The garnishers may be examined as to his indebtedness, he may dispute its liab. or he may pay the debt to the judgment creditor, who can recover by means of a more one if he does so. (Common Law Procedure Act,” 1854.)

GARSTANG. [LANCASHIRE.]

GASES. LIQUIDATION OF. [CHEMISTRY, §§ 1.]

GASTROINTESTINAL GAS. [MEDICINE.]

GAULTHERIA. A genus of plants belonging to the natural order Ericaceae. It has a 5-leaflet or 5-toothed calyx, hypanic at the base, after flowering becoming large and succulent, and covering the capsule with a capsule coating. The corolla is ovate, venicose, with a 5-leaflet revolute border, transparent at the base. There are 10 stamens, inclosed, with filaments; anthers hissed at the apex; lobes biastriate. The hypogynous scales 10, usually united at the base. The ovary half inferior. The capsules 5-seeded, with a loculicidal opening. The species: G. procumbens, Partridge-Berry, Cheesep-Berry, Bohoerry, Mountain-Tea, is found on sterile sand and gravel in mountainous forests in the drier situations in North America. It has a horizontal woody rhizome, often a quarter of an inch in diameter, connected with the roots. The leaves are high, round and somewhat downy. The leaves are scattered near the extremities of the branches, evergreen, coriaceous, shining, oval, or orbata, acute at both ends, revolute at the edge, and furnished with a few small serratures, each terminal by a glandular spot. The flowers are small, white, on a round downy stalks. There are two concave heart-shaped bracts. The calyx is white, clasped into 5 roundish acute segments. The corolla is white, ureolate, 5-angled, contracted at the mouth, the limb divided into 5 short reflexed segments. The flowers are white, ureolate, 5-angled, with a tuft of hairs on a short style. The flowers are white, ureolate, 5-angled, with a tuft of hairs on a short style. The flowers are white, ureolate, 5-angled, with a tuft of hairs on a short style. The flowers are white, ureolate, 5-angled, with a tuft of hairs on a short style.

GAUSS, CARL FRIEDRICH, one of the most celebrated mathematicians of his day, was born at Brunswick, April 22, 1777. He displayed early such marked talent for the abstract sciences, that the Duke of Brunswick, Charles Alexander, took him into his family, and in 1796 he was able to publish a small dissertation on the observation of the planets and asteroids. His dissertation was entitled “Theoria motus corporum celestium,” published at Hamburg, in 4to, in 1809, to which Professor Pauker added, in a separate pamphlet, a geometrical formula, more definitely proving the truth of the principle of the linear triangulation upon which the solutions of which Gauss’s dissertation mostly depended greatly contributed to the succeeding more exact and useful application of the astronomical observations to which, about this time, the attention of the scientific world began to be directed. His “Theoria combinatarum Observationum errorum” was published in 1816, and in 1825, the supplement, issued in 1829. From the same place, was a great addition to scientific knowledge.

On the completion of the Göttingen Observatory, Gauss devoted himself to astronomical observations. On the appointment of the government council, and for applying the Danish admixture of an arc of the meridian to the kingdom of Hanover, he invented the means of making distant stations visible, by reflected sun-light, by an instrument known as the heliometer. Afterwards he was zealously occupied with a discussion of the terrestrial magnetism, for which purpose the government caused a building to be erected for his experiments, near the observatory. By the labours of himself and W. Weber, the science of terrestrial magnetism assumed a new and important phase. The theory was explained by them in conjunction in the Transactions of the Magnetic Union, under the title of “Resultates aus den Beobachtungen des Magnetischen Vereins in Jahre 1836, herausgegeben von C. F. Gauss und Wilhelm Weber” (published by C. F. Gauss, the Magnetic Union volume for 1839, published at Leipzig in 1940, with an “Atlas des Erdmagnetismus, nach den Elementen der Theorie entworfen.” In 1841 he published at Göttingen his “Dioptische Untersuchungen” (“Dioptical Investigations”). This was his latest work on this subject, and was the first essay of a series upon which he published at Göttingen in 1844, under the title of “Untersuchungen über Gegenstände der höhern Geodesie.” In this, with a modest pride, he speaks of the trigonometrical soundings as “partly executed by myself, and partly under my guidance.” This was contributed to the Transactions of the Royal Scientific Society at Göttingen, and appeared in the second volume. He died on February 23, 1855.

We do not attempt to give a complete list of Gauss’s works: he contributed many papers to scientific publications, but the following are among the more interesting that have appeared separately, in addition to those already mentioned:—


GAY-LUSSAC, NICOLAS-FRANÇOIS, was born at St. Leonard, in the department of Haute-Vienne, on December 6th, 1778. He was educated at the Polytechnic School, where his sagacity and talents gained him the friendship of the famous professor of mathematics, Dr. Berthollet. He was appointed to the scientific department of Les Ponts et Chaussées. The expansibility of the gases was at that time a subject exciting much attention; and Gay-Lussac gave the law of dilatation, and showed its constant uniformity. His application to the subject led M. Charles, a scientific physician, to recommend...
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him the use of the balloon, just previously invented, was an excellent means of testing some of his theories, of making fresh experiments, and of at least exciting public attention by such novel means of the pursuit. In connection with M. Biot, he made the proposal to the government; Laplace and Berthelot supported it; and M. Chapital, then Minister of the Interior, gave them the balloon which had been constructed for the use of the police. Furnished with chronometers, thermometers, barometers, hygrometers, electrometers, compasses, and papers and pencils, Messrs. Gay-Lussac and Biot ascended from the garden of the Conservatoire des Arts et des Mâtres on August 19, 1804. Their first ascent, and the air lost 1° of heat for each additional height of 174 metres (180 yards). On this occasion he brought down, in bottles carefully prepared for the purpose, some air from the highest point reached, which on analysis was found to be composed of 75.44 per cent of nitrogen and 24.56 per cent of oxygen. After a voyage of six hours he descended at a village about 61 miles from Rouen.

M. Charles had been correct in supposing these experiments would draw attention to his experiments, and he was introduced to honour, titles, and illustrious friends. Of the society of Arecueil, instituted by Laplace and Berthelot in 1804, consisting at first of only nine members, Gay-Lussac was one. He met Alexander von Humboldt, with whom he was to have a long correspondence, and who showed him the memoirs on which were furnished to the society. In conjunction also with Von Humboldt he endeavoured to determine the position of the magnetic equator, and its interconnection with the terrestrial equator. Gay-Lussac's chief attention however was directed to the Volcanic pile, and the decomposition of acids and alkalies. Napoleon I. had instituted a magnificent prize for the most important discovery made by means of the pile, hoping that it would be gained by one of the members of the Polytechnic School, but when asked to take sides he could not do it, having lost any chance of being able to obtain any grand results. He ordered a colossal one to be constructed immediately, and with it Gay-Lussac and M. Thénard commenced their experiments in 1806.

The result was a work in 2 vols. published in 1811, 'Recherches physico-chimiques sur le pile, sur les acides, sur les acides, l'analyse végétale et animale, &c.' The discoveries, and the improvements on methods of Davy, detailed in this work, were of great importance. In 1816 he was made Professor of Chemistry in the Polytechnic School.

Gay-Lussac's life was one of constant activity. Though he only published two works, and those little more than pamphlets, 'Mémoire sur l'IDEE,' and 'Mémoire sur le Cyanne,' both highly esteemed, he wrote more than a hundred papers on various subjects, and all of great utility. Besides the subjects already mentioned, he wrote on hygrometry, on capillary attraction, on the distinction between oxides and hydrates; and to him is due the discovery of the hydrosulphuric acid, which he first isolated. Some of the very important chemical lectures delivered by him at the Sorbonne, taken down in shorthand, have been published in two volumes.

The merits of Gay-Lussac were not unresented by his country. From 1806, he was repeatedly chosen a member of the Chamber of Deputies, and in 1807 was chosen a representative of the first district of Paris. He was a member of the Academy of Sciences, honorary professor of natural philosophy at the Sorbonne, professor of chemistry at the Jardin du Roi, director of the mint of works in gold and silver, editor (with M. Arago) of the 'Annales de Physique et de Chimie,' with several other official employments connected with the manufacturing industry of France. After a long life of useful labours, and in the enjoyment of excellent health at the age of eighty, he died on May 12, 1850, at Paris, in the mansion provided for him in the Jardin du Roi.

GAYAL, [O.]

GEDRITE. [MINERALOGY, S.]

GIBRALTAR, [O.]

GIESEKE, [O.]
noble. Mine was a Swedish notion of selflessness, drawn from an imperfect state of society, where the connection between

A periodical works vols., them blameless but "Fnhetstiden", hostile accepted," Iduna, friend, periodicals am Sweden trial ration, journey of sophical his quent Fant, students. bers odicals, childish of in admir ing was his Macbeth appointed to Afzelius Geijer, however in 1844. Geijer put forth, in 1813, a translation of "Macbeth;" and between 1814 and 1816 was associated with Afinancial in the publication of a collection of Swedish popular ballads, "Svenska Folkvisor," in 3 vols., to which however Geijer contributed little more than introductory matter. He had held from 1810, when he was elected during his absence in England, a subordinate post in the University of Upsal, and for some years was in search of a position that would enable him to marry. In 1816 he was appointed professor of history at the University of Upsal, on his retirement; he then married a lady to whom he had been engaged before his journey to England, and in the next year, on the death of Fast, he succeeded to the full professorship. His first lectures had an unexampled popularity, and the lecture-room was crowded, not only with students, but with the best society of Upsal, including ladies. These early lectures were different both in matter and manner from those which his modern colleagues call "expository," but as he grew more profound he became less popular, but he still continued the pride of the university and the favourite of the students. His success with the elegance of Sten Sture had proved his genius, but had not proved the steadfastness he was characterised by the king, who was distressed by his death, and the musical tastes interfered a good deal with his other pursuits, and it was remarked that when he had once got to a pianoforte, it was not easy to get him away from it. He had also frequent leave of absence for the purpose of prosecuting historical researches. One of the most prominent incidents in his academic life was an academic trial to which he was subjected on account of his theological opinions. In an edition which he published about 1820, of the works of Thörner, a Swedish philosophical successor, some passages in the introduction by Geijer, which was entitled, "A Philosophical or Uphilosophical Confession of Faith," were regarded by some of his colleagues as hostile to the doctrine of the Church-Christians, and he was summoned before the ecclesiastical authorities; but a long examination terminated in an acquittal, which wascelebrated as an important triumph of liberty of thought and liberty of the press in Sweden. Geijer's position in the press and in the Church-Christians, I am not a Bible-Christian; I am, so to speak, a Christian on my own account;" and he concludes a statement of his way of thinking in theology with the declaration, "If this is Christianity, I am a Christian." The trial, which he was called to face for the first time, being twice offered a hibiscopic, that on the second occasion being in his native diocese of Carlstad, a distinction the more flattering that in Sweden a bishop must in the first instance be nominated by the clergy. He declined on both occasions. "Perhaps if I accepted," he wrote to a friend, "they might have a harmless middling bishop, but there would be an end to Erik Gustaf Geijer. It is not pride that swells my breast, but an ambition for the time."

For the University of Upsal I am somebody. That would lose more than Wermelund gained." Geijer was in 1839, in a distinguished position as the head of Swedish historical literature. He planned a great history of the country, to supersede that of Dalin and Lagersond, who have been for Sweden what Hume and Smollett have been for England; and it was universally acknowledged that he could have executed a volume of "Svea Rikes Häftor," or "Records of Sweden," promised a masterpiece. Unfortunately, the great work was never carried further. Before proceeding with it the author went to America, and he returned some years later to the same undertaking, having once in 1846, in the Swedish history, the histories of Europe, set on foot by Leo and Uckert; and this was carried before 1843, in three volumes, to the death of Queen Christina, but there it stopped. The professor, in place of continuing it, was occupied in examining the papers of Gustave III, which the king had bequeathed to the University of Upsal, in a chest not to be opened till fifty years after his death. The work was undertaken, by "Konning Gustaf III:s efterlemnade Papper ofversikt och ordning," in 1834, and it was there disappointed the public expectation, but more owing to the insignificance of the royal legacy than to any defectiveness on the part of the editor.

Geijer was not sated with speculations in politics and political economy. Twice he was the representative of the University of Upsal at the diet, and while on the first occasion he was a warm defender of monarchical power, in the second (in 1830) he saw cause to modify his views, and lost the approbation of several of his followers. In 1832 a change of opinion in favour of progress and liberalism, which he avowed and defended in a periodical called 'Litteraturbladet,' written by himself. His views of panerism were developed in 'The Poor Laws and their bearing on Society, or a Series of Political Essays' (published in Upsal, and afterwards published in English (Stockholm, 1840) as well as Swedish, and of which the English version, as it bears to translator's name, and has marks of a foreign hand, may possibly be from his own pen. A dissertation on the history of Sweden during the 'Frihetstiden,' or 'Freedom-Time,' as it is called, which extended from the death of Charles XII. to the revaluation in favour of regal power which was forcibly effected by Gustavus III, is the last of Geijer's works of much importance. The constitution of the liberal, aristocratical government did not pass unquestioned, and were the subject of a controversy with Fryxell. During about thirty years Geijer continued one of the literary magnates of Sweden, in constant intercourse with all that was distinguished in the literary world. His residence in Stockhol and Atterbro, had a correspondence with Frederika Bremer, and wrote both verses and music for Jenny Lind. In 1846 his health began to break, he was obliged to pay a visit to the Schlangenbad of Nassau, and resigned his professorship. He died at Stockholm on the 3rd of April, 1847—a year which was fatal to many of the literary celebrities of Sweden. A collected edition of Geijer's works was commenced soon after his death; but it is still incomplete, though advanced (in 1860) to thirteen octavo volumes. A life by his son, Knut Geijer, is prefixed to the first volume, but before the second sheet had been printed the writer suddenly died. Most of the works of Geijer have been already more or less translated into English. His translation of 'Smollett's Rikes Historia,' of which an English translation by J. H. Turner was published in London, and the first volume of a continuation of which by Carlsson was issued in German, in Leo and Ucker's collection of this period. Many of the volumes of his works were occupied with shorter pieces, articles in periodicals and papers read before the Swedish Academy, of which Geijer became 'One of the Eighteen' in 1824, and was afterwards for some years President. The academical dissertations of Geijer have been collected in two volumes, of which one—in particular on the Swedish colonies in America—are of considerable interest. His letters and his minutes of conversations with Bernadotte, with whom he seems to have been a favourite, were first printed in this collection, and emruse much that is worthy of notice and
preservation, especially when taken in conjunction with his
Minnes, or 'Reminiscences,' perhaps his most attractive
products. The long life of this
finch was left with
finished. It should be observed that Geijer had not only a
taste but a talent for music, and enjoyed some reputation as a
musical composer, a volume of music having been published
in his own handm.sel by

GEINE. [Chemistry, S. 2]

GELATIN. [Tissues, Organic, S. 1]

GENERATIONS, ALTERNATION OF. During the course
of the development of many of the lower animals from
the ovum to their adult condition, they not only pass
through various forms, as is seen in the insect tribes
[Insecta], but at certain stages of their growth they possess
the power of multiplying themselves. The individuals
which exhibit this phenomenon have been called 'nurses,' such
animals being pluripotent. The mode of reproduction in
the mode of reproduction have been called by its first expounder,
Professor Steenstrup, an 'alternation of generations.' This
phenomenon has been particularly observed in the Acephala,
Endea, Polyplegsa, Salpa, and Vorticella. In the various
articles on these families of animals, their mode of develop-
ment is described. As however this subject is one of general
interest, and very imperfectly understood, we take the
opportunity of reproducing here Professor Steenstrup's gen-
eral views on the subject, from a translation of his work
published by the Ray Society:

"The mode of development by means of 'nurses,'
or intermediate generations, is thus seen to be no longer an
isolated phenomenon in nature. The circumstance of an
animal developing itself in a manner more or less distinctly
in its own, but which itself produces a new generation, which
either itself or in its offspring returns to the form of the
parent animal, is a phenomenon not confined to a single
class of lower animals. The vertebrate class is the only one in
which it has not been observed. It would, however, appear
that there is something intrinsic in this mode of
development, and that it occurs as it were with a certain
necessity; on which account it will undoubtedly soon be
recognized in the vertebrata and mankind. It is by no
means to be considered as something paradoxical or ano-
malous (as we have hitherto been too much inclined to deem
both it and the phenomena in which it is exhibited), it must
be in harmony with the rest of development in nature, in
which the fundamental principle of this course of develop-
ment must also be elsewhere expressed, although it may be
displayed in a form under which we shall less readily per-
ceive and recognize it. This is seen when we trace the
mode of development in question more widely through
nature; and whilst considering it not as an isolated view
but also when considered in which it is manifested, we comprehend it in its true
light.

If we collect and regard in one view the whole system of
development exhibited by the individuals of the same
species as are exhibited in the Bell-Shaped Polypes (Clamostoma), the
Claviform Polypes (Coryne), Medusa, Salpa, Vorticella, and
Entosoa, it appears as a peculiar and consequently an
essential feature in this course of development, that the
species (that is, the species in its development) is not wholly
represented in the solitary, full-grown fertile individuals of
both sexes, nor in their development; but that to complete
this representation, supplementary individuals, as it were, of
one or of several preceding generations are requisite. Thus,
the distinction between this course of development and that
which is generally recognised in nature, in which the species
is represented by the individual (of both sexes) and its de-
velopment, is the want on the part of the individuals of a
complete indefinite period, instead of only being represented
by a specific individual, if I may so express it. If I should
agree to regard such an incompleteness in the individual as
the essence of this development, we shall comprehend its
significance in nature when we thoroughly consider this
course of development in various periods, throughout the
above-mentioned families, how it begins and advances, so
that at last we discover to what it tends. I believe, also,
that we might trace even now this development by means of
preparing many generations of 'nurses' in its peculiar
course and advance, as it is described in the foregoing pages,
and the many gaps in the series of observations. Thus we see the greatest incomple-
theses and the highest degree of mutual dependence in the
Comparative course and similar Polypes, in which the generations
representing the unity of the species are very unlike each
other, and in which all the individuals that are used, as it were,
in an outward unity, or into the Polyplegsa, the organic
connection between the individuals and generations is rather more lax;
the perfect geminants or ovigerous individuals are usually quite free, often
even at the same time. While, on the other hand, in the
nurses, and which, in order to the
foundation of a new polypyl stem type. In the Coryne, or clavi-
form Polyplegs, the organic connection between the individuals
and generations is rather more lax; the perfect geminants or
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form Polyplegs, the organic connection between the individuals
and generations is rather more lax; the perfect geminants or
new exhibited, the endeavour to attain something higher is manifest. Each link or generalisation certainly brings its offering nearer to the highest perfection. Accordingly, the aim towards perfection is affected only by means of the 'nursing' by special animals, and is committed to the still and quiet activity of an organ, without the nursing animals there and those being essential to man and not an expression of the will. In all parts of the animal kingdom we see the instances of the still, quiet, and unconscious activity of the animal being developed into voluntary actions, which are undertaken by it from an internal, involuntary action. This is the case in this instance. The development and mode of feeding or nourishing the young, exhibited in its course, of Bees, Wasps, Ants, and Termites, affords a direct example of a mode of which the care of the young is provided for, by the voluntary action of numerous individuals devoted to that object. Those of the young which are to be developed into the more perfect fertile individuals are not protected in the body of the foster-parent, nor is their nourishment secured by one of the organs; both protection and food are afforded them by means which are brought about by the conscious activity of the 'feeders.' The Wasp, for instance, or the Wild Humble-Bee, which has been impregnated in the autumn, and has afterwards sought a shelter to protect itself, begins the nourishment of its offspring in which it builds cells and deposits its eggs. From the eggs proceed larvae, but the insects into which these larvae are metamorphosed, are not fertile; they are barren, and all their faculties are directed to the assisting of the parent. Whether the young of termites to which end some of their external organs are transformed, and to the erection of a better habitation and cells, into which they convey the eggs of the female, and the food of the larvae to be developed from them. Other cells, which continued to be in no case an ovary, and by which numerous progeny of eggs; and again in others, which are more roomy and provided with the best kind of food, but of which there are only a few, is the last brood of the female developed. From the first kind of cells proceed the barren individuals, from the second the males, and from the third the females; after undergoing a metamorphosis, the males and females fly away, impregnation takes place, and the males die; the females however retain, and the whole multitude of barren individuals, which at the same time perform the duty of feeding the young, build cells for their various progeny of eggs, and nourish the three forms of larvae which proceed from them. In this way the inhabitants of the colony become very numerous; nevertheless they all die off in the autumn, and the species propagates the species the year following, under the same development of alternating broods, the earlier of which is always by far the most numerous, and assists in the development of the latter. In the course of Bees, Ants, and Termites, the process of the honey being carried by the individuals which constitute one of those colonies are principally 'feeders,' or individuals which have originated in the precedent divisions of the eggs of the females, and in these is exhibited, even with greater precision, a more marked division of labour in the feeding of the progeny; so that, out of the various precedent divisions, individuals apparently arise which assist in the development of the more perfect progeny in various ways. Thus, there are a hive of bees, individuals which are employed almost wholly in the feeding of the larvae (foragers), whilst others do scarcely anything else than collect wax and build cells (workers). In ant-hills, one set of the feeders is constantly employed in conveying the larvae from one place to another, according as they require the larvae to be brought to the building or the excavations around the habitation. Among the Termites also we are acquainted with several forms of fields which are employed almost wholly in the feeding of the young, but not only by the young of the young, not only by the young of the young, but of the whole community.

Now in the cases in which the more perfect development of the progeny is promoted, either by means of 'nurses' or of 'feeders' (under which latter term we understand special individuals devoted to the actual care or nourishing of the young, which office they fill by a conscious activity), we find that nature has given us a view of the general type of individuals to whose care or life is thus committed the perfecting of a later generation or progeny, consisting of less numerous individuals. This previous or preparatory individuality being essentially different from all previous species, on which account the males of all the animals among which the system of 'nursing' or of 'feeding' obtains, constitute a very subordinate number. That the 'nursing' should be committed to individuals which are as we are acquainted with an organ in them whose natural function would be to perform that office. The generative organs are, indeed, in perfect (female) individuals divided, as it were, into two parts of very distinct natures; the ovary for the preparation of the germ and the production of the egg, and the oviduct and uterus, in which the ova are, as it were, incubated, and the germ and embryo sufficiently developed to allow of its being born. Now, it is actually the case that no true ovary has been discovered in the 'nursing' generative; on the contrary, the female organs, as soon as they are perceptible, are situated in organs which must be regarded as oviducts and uteri, as, for instance, in the most perfect 'nurses' we are acquainted with, the *Aphides.* In the case of those individuals which have remarked that the germes in their earliest condition are collected into an organ at the root of the tail, which may possibly be regarded as a uterus, and that they appear to distend this organ gradually to the size of the whole body. It cannot, however, be accurate so the *Salpa* also show in the most precise way that the associated brood of the *Salpa* does not originate from ova, but that, as germes which are arranged in a definite manner between the walls of a hollow organ, is contained in what can be no case an ovary, and is always produced in a 'germ-tube.' This organ lies in a cavity which may probably be considered very nearly a uterus, which is however always, as it were, a secondary receptacle for the germ; it contains, as it were, an embryo, in the form of individuals which have occupied any previous receptacle or place of formation.

From what we at present know, we may probably assume with some degree of certainty that the 'nursing' individuals are never themselves germipporous, but that they are born with germes in the organs in which the embryos are afterwards nourished; and from all this it appears as if the female generative organism were always divided in those cases in which development by means of 'nurses' occurs, so that as in the more perfect females an ovary especially is formed, so the 'nursing' individuals must have been always presented, in consequence of which, they, as individualised uteri, have assigned to them, as the object of their existence, the performance of the functions of a uterus, and their complete formation must necessarily have been that of the organs which are committed to the fostering of the young. We cannot readily perceive the reason, that because all 'nursing' individuals must be of the female sex, it should follow that all those individuals which feed the young should also be of that sex, and yet this seems to be the case. Anatomy shows us that the 'feeders' amongst bees, wasps, &c., and probably those of all insects living in regular societies, are females, whose sexual organs remain in an undeveloped state. They present scarcely the vestige of an ovary; the uterus is rudimentary, and all propagation consequently in the material way, so to say, is rendered impossible; the imperfection of the organ does not even allow of their acting as 'nurses,' and the propagative instinct in a physical corporeal sense passes into a will for the propagation of the species, into a nerve impelling the feeding individuals to render the necessary amount of these impulsive duties is favoured by the peculiar transformation which some of the organs undergo at the expense of those intended for propagation, in order that they may become more efficient in the performance of their duties. Whether it be, that the development of the species in this case does not take place by means of several generations, but through several broods of the same generation. The reason of the great number of 'feeders,' and for the common good of the colony, we shall accordingly understand the way the fertile individuals scarcely amount to hundreds, may be readily understood when we consider more closely the regular societies of bees and ants, and witness the labour required for the nourishment of the young. But, on the other hand, how the development of the species is promoted by the
multitude of "nursing" animals of which we often see thousands for each single fertile one, appears to us difficult of explanation, since, even all of them can only be regarded as animals which do not appear to differ from others in any other. It does not however seem to me improbable that even the Aphides, trematode mares, and other parasites, which are so immediately injurious to the organisms upon which they live, are not destined merely to promote the extension of the species, but that they also induce in the organisms themselves conditions necessarily more and more favourable to a later generation; plants also and animals afford us many instances that to a certain abundance of parasites there usually succeeds a complete overflow of them.

"I conclude with the remark that, insomuch as in the system of 'nursing' the whole advancement of the welfare of the young is effected only by a still and peaceful organic action, it is not unlikely that the whole of the vital life of the individual, so also all those forms of animals in whose development the 'nursing' system obtains, actually remind us of the propagation and vital cycle of plants. For it is peculiar to plants, and, as it were, their special characteristic, that the germ, the primordial individual in the vegetation or seed, is competent to produce individuals which are again capable of producing seeds or individuals of the primary form or to that which the plant owed its origin, only by the immediate union of its generative products. Unlike this, the great triumph of Morphology, that it is able to show how the plant or tree (that colony of individuals arranged in accordance with a simple vegetative principle or fundamental law) unfolds itself, through a frequently long succession of generations, into the multitude of beings, becomes more perfect, until, after the immediately preceding generation, it appears as calyx and corolla, with perfect male and female individuals, stamens, and pistil (so that even in the vegetable kingdom the greater hermaphroditism does not obtain, which is still supposed to take place in the animal); and after, the fructification brings forth seed, which again goes through the same course. It is this great and significant resemblance to the vegetable kingdom, which in my opinion is, I think, a proof of the identity of generation, and all to which I have alluded in the preceding Essay: I might almost say that the condition of continued dependence incidental to the animal life, is to a certain extent one of less perfection that that which is presented in the progressive elevation in development effected by the agency of the vegetative life."'

GENTIANINE. [CHEMISTRY, S. 2.]

GEOGRAPHY. [MINERALOGY, S. 23.]

GERARD, ENCOMIUM ET ETYMOLOGIE, COMTE, Marshal of France, was a native of Davilliers, in the department of the Meuse, and was born April 4, 1773. He entered the army as a volunteer in 1791, and first saw fire under Jourdan, at Fleurus. He was already a captain in 1799, and Bernadotte, who commanded in the north, saw him in action soon after one of his aides-de-camp. After the treaty of Campo Formio, he attended that general in his embassy to Vienna, and having saved his life during a riot stimulated by the Austrian police, a lasting friendship was established between them. In 1799 he became a chef-d'escadron; and at the battle of Amelotis (Dec. 2, 1800) his good conduct was so conspicuous that he received the Cross of the Legion of Honour on the field.

In 1806 Gerard was appointed to a brigade; and in 1809, at the battle of Wagram, Bernadotte gave him the command of the Saxon cavalry. He next went to serve in Spain, where he continued until October 1811, having been present at the battle of Albuera and several of the important actions of Marshal Macdonald: he was present at the battle of Bailen, and his exertions, which were made on the impulse of the moment and without orders, accelerated the victory. He charged the battery and bayoneted the officers (or rather contrary to orders at Goldberg, and rout the Prussians with great slaughter, for which feat of arms the emperor gave him the command of the 11th corps. General Gerard was several times injured at the battle of Leipzig, October 16, 1813. During the defence of the French territory in 1814, his zeal and intrepidity were frequently commended by Napoleon, especially at the victory of Montees.

After his return from Elba, in 1816, the Emperor gave him the command of the 2nd cavalry corps, and at the battle of the 18th of June he was under the orders of Marshal Grouchy at Waterloo, and when the report of the cannon was heard proceeding from the forest of the Soignes, Gerard recommended an immediate advance of Grouchy's army of reserve to support him.

On the return of Louis XVIII, Gerard retired to Belgium, where in 1816 he married the daughter of General Valence. The following year he was permitted to return to France. In 1830 Louis Philippe appointed him minister of war, but his health compelled him to resign this office a few months later. In 1832 he was sent to besiege the fortress of Antwerp, defended by the Dutch general Chasse, when, having compelled the garrison to capitulate after a gallant defence, he returned to France and was made a peer. In 1834 the citizen king made him president of the council, or prime minister; but his declining health obliged him to resign this office on the 26th of October, after which he withdrew into private life. It is certified that on February 14, 1849, raised Marshal Gerard to the function of Grand Chancellor of the Legion of Honour. The Marshal lived to see the restoration of the Bourbons. He died at Paris, August 17, 1852, and was interred in the chapel of the basilica of the Madeleine. Thus he lived in the utmost mental and moral perfection, and at the age of 108 years, the eldest marshal of France who has ever lived, while he enjoyed the last moments of life, during the night of the 21st of December, 1852. Among his principal works was a commentary on his maps (or geographical atlas) of France, published in 4 folio volumes, 48 plates in mezzotint and 36 plates in lithographic wood engraving. Another atlas of France, with 44 plates in mezzotint, was published in 1824, with a commentary in English, French, and Latin. He also published a commentary on the maps of Spain and India, and a commentary on the maps of the World. He published also a commentary on the maps of the Moselle, in 1845. Among his other works was a commentary on the maps of the Seine, published in 1849. He also published a commentary on the maps of the Moselle, in 1845. Among his other works was a commentary on the maps of the Moselle, in 1845. Among his other works was a commentary on the maps of the Moselle, in 1845. Among his other works was a commentary on the maps of the Moselle, in 1845. Among his other works was a commentary on the maps of the Moselle, in 1845.
GEYSERS. This name is applied to a series of intermittent hot-springs, situated in the south-western division of Iceland. A hundred and one of them are said to break out within a circuit of two miles. These springs are evidently connected with the volcanic phenomena which so remarkably characterise the whole district of Iceland. A recent investigator of the eruptive phenomena of Iceland thus describes its activity. "The surface of the Iceland slopes gradually from the coast towards the centre, where the general level is about 3000 feet above the surface of the sea. On this, as a pedestal, are planted the Jökull, or Ice Mountains of the region, which extend both ways in a north-south direction. Along this chain the active volcanoes of the island are encountered, and in the same general direction the thermal springs occur, thus suggesting a common origin for them and the volcanoes. From the ridges and chasms which divide from the mountains mighty masses of steam are observed to issue at intervals, hissing and roaring, and where the escape takes place at the mouth of a cavern, and the resonance of the cave lends its aid, the sound is like that of thunder. Lower down in the valleys is observed that it is continued in a thin vapour, a repulsive blue-black ammoniacal Pence is balled, rising at times into huge bladders, which on bursting scatter their slimy spray to a height of 15 or 20 feet. From the base of the hills upwards extend the gushing springs, the shallow-fields which crown the summits. From the arches and fissures of the glaciers vast masses of water issue, falling at times in cascades over walls of ice, and spreading for miles and miles over the country. Excessive morasses and springs are thus formed, which lend their inoffensive monotony to the dismal scene already before the traveller's eye. Intercepted by the cracks and fissures of the land a portion of these waters is conducted to the hot rocks underneath; here, mere water, the water, hot springs, are produced. Where the ground regions, both travel together, to issue at the first convenient opportunity either as an eruption of steam or as a boiling spring."

The origin of the water which feeds the springs is here hinted at. That origin is atmospheric. The summits of the Jökull arrest and mix the clouds, and thus cause an extraordinary deposition of snow and rain. This snow and rain constitute the source from which the springs are fed. The Jökull, the snowmelt, the air, these are the main factors every spring, exactly as we find them in rain water, furnish the proof of this; for the known deportment of these substances preclude them from being regarded as real volcanic products."

The springs which feed the Geysers, and which are poured out from them again boiling, probably take their rise in Mount Hecla, the summit of which is not more than 30 miles from the Geysier district. It is here that the rushing water is sometimes heard in chasms beneath the surface, and it has more than once happened that after earthquakes some of the boiling fountains have increased or diminished in violence and volume, or entirely ceased, or that new ones have made their appearance. The phenomena of the Geysers of Iceland have for a length of time arrested the attention of naturalists, and many explanations of them have been given. No one has however so successfully investigated the subject as Professor Bunsen, of Giessen. A summary of these views, with experimental observations, were presented to the Royal Institution by Professor Tyndall in June 1853. After referring to the general eruptive phenomena of Iceland, he described the Great Geysier."

"We have here," he says, "a tube 10 feet wide and 70 feet deep; it expands at its summit into a basin, which from north to south measures 52 feet across, and in the perpendicular distance 60 feet. The interior of the tube and basin is covered with a beautiful smooth plaster, so hard and close as to make it impossible that anything but that presents itself, as how was this wonderful tube constructed? How was this perfect plaster laid on? A glance at the constitution of the geyser water will perhaps furnish the first surmise. In 1000 parts of the water the following constituents are found—

<table>
<thead>
<tr>
<th>Substance</th>
<th>Parts per Million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silica</td>
<td>0.0597</td>
</tr>
<tr>
<td>Carbonate of Soda</td>
<td>0.1339</td>
</tr>
<tr>
<td>Carbonate of Ammonia</td>
<td>0.0083</td>
</tr>
<tr>
<td>Sulphate of Soda</td>
<td>0.0083</td>
</tr>
<tr>
<td>Sulphate of Potash</td>
<td>0.0083</td>
</tr>
<tr>
<td>Sulphate of Magnesia</td>
<td>0.0047</td>
</tr>
<tr>
<td>Chloride of Sodium</td>
<td>0.5261</td>
</tr>
<tr>
<td>Sulphate of Potash</td>
<td>0.0083</td>
</tr>
<tr>
<td>Carbonic acid</td>
<td>0.0557</td>
</tr>
</tbody>
</table>

"The lining of the tube is silica, evidently derived from the water; and hence the conjecture may arise that the water deposited the substance against the sides of the tube and basin; but further examination, and especially the deposition of the tube cooled down to the freezing point. It may be bottled up and kept for years as clear as crystal, and without the slightest precipitate. A specimen brought from Iceland and analysed in this institution was found perfectly free from sediment. Further, we must consider that in this way would imply that we took it for granted that the shaft was made by some foreign agency, and that the spring merely lined it. A painting of the Geyser, the property of Sir Henry Holland—himself a witness of these wonderful phenomena—was exhibited. The painting, from a sketch taken on the spot, might be relied on. We find here that the basin rests on the summit of a mound; this mound is about 40 feet in height, and a glance at it is sufficient to show that it is strongly erected by the Geyser. But in building the mound the spring must also have formed the tube which perforates the mound; and thus we learn that the Geyser is the architect of its own tube. If we place a quantity of the geyser water in the basin the following takes place—In the centre the fluid begins to bubble; the next takes place here; the edges where it is drawn up the sides of the basin by capillary attraction, and thus subjected to a quick evaporation, we find silica deposited; round the edge we find a ring of silica thus laid on, and not until the evaporating is continued for a considerable time do we find the slightest turbidity in the central portions of the water. This experiment is the microscopic representative, if the term be permitted, of nature's operations in Iceland. Imagine the case of a simple thermal spring, but one in a basin which is kept at a temperature of 100 feet, and with a gentle incline; the water thus exposed evaporates speedily, and silica is deposited. This deposit gradually elevates the side over which the water passes, until finally the latter has to choose another course; the same takes place here, but until the ground becomes elevated by the deposit as before, and the spring has to go forward thus it is compelled to travel round and round, discharging its silica and deepening the shaft in which it dwells, until finally, in the course of centuries, a column is raised which has so long puzzeled and astonished both the traveller and the philosopher."

"Before an eruption the water fills both the tube and basin; detonations are heard at intervals, and after the detonation a violent outburst occurs; the column of water in the pipe appears to be uplifted, thus forming a conical eminence in the centre of the basin, and causing the water to flow over its rim. The detonations are evidently due to the production of steam in the subterraneous depths, which, rising into the cooler water of the tube, becomes condensed and produces explosions similar to those produced on a small scale when a flask of water is heated to boiling. Between the interval of two eruptions the temperature of the water in the tube towards the centre and bottom gradually increases. Bunsen succeeded in determining its temperature a few minutes before a great eruption took place; and these observations furnished to his clear intellect the key of the phenomena. A little below where the water was within two degrees of its boiling point, that is, within two degrees of the point at which water boils under a pressure equal to that of an atmosphere, plus the pressure of the superincumbent column of water. The actual temperature at 20 feet below the bottom was at a fixed six feet by the generation of a mass of vapour below. The liquid spreads out in the
basin, overflows its rim, in time the elevated section has six feet above the lowest one upon its surface. A boiling point under this diminished pressure is 191°C; hence in its new position its actual temperature (192°C) is a degree above the boiling point. This excess is at once applied to the generation of steam; the column is lifted higher, and its pressure further lessened; more steam is driven off; and thus, after a few convulsive efforts, the water is ejected with immense velocity, and we have the geyser eruption in all its grandeur. By its contact with the atmosphere the water is cooled, falls back into the basin, sinks into the tube through which it originally ascended, and fills the basin again.

The detonations are heard at intervals, and ebullitions are observed; but not until the temperature of the water in the tube has once more nearly attained its boiling point, and the lifting of the column able to produce an eruption.

"In the regularly-formed tube the water nowhere quite attains the boiling point. In the canals which feed the tube, the steam which causes the detonation and lifting of the column must therefore be formed. These canals are in fact nothing more than the irregular continuation of the tube itself. The tube is therefore the sole and sufficient cause of the eruptions. Its sufficiency was experimentally shown during the lecture. A tube of galvanised iron six feet long was sunk into the earth in a field near the University, and one near its centre to imitate the lateral heating of the geyser tube. At intervals of five or six minutes throughout the lecture eruptions took place; the water was discharged into the tube, which was then filled back into the basin called the tube, became heated again, and was discharged as before.

"Sir George Mackenzie, it is well known, was the first to introduce the idea of a subterranean cavern to account for the phenomena of the Geyser. His hypothesis met with general acceptance, and it is even possible that some of those who accompanied Bunsen to Iceland. It is unnecessary to introduce the solid objections which might be urged against this hypothesis, for the tube being proved sufficient, the hypothetical cavern disappears with the hypothesis which required it.

"From the central portions of the geyser tube downwards, the water has stored up an amount of heat capable, when liberated, of exerting an immense mechanical force. By an easy calculation it might be shown that the heat thus stored up could generate, under ordinary atmospheric pressure, a column of steam having a section equal to that of the tube and a height of nearly 1300 yards. This enormous force is brought into action by the lifting of the column and the descending water, which is stirred up by the eruption of ashes. A moment's reflection will suggest to us that there must be a limit to the operations of the Geyser. When the tube has reached such an altitude that the water in the depths below can no longer communicate pressure, cannot attain its boiling point, the eruptions of the water cease. Yet when pressure is thus released, the water, however continues to deposit its silica and forms a 'lang,' or cistern. Some of those in Iceland are of a depth of 30 or 40 feet. Their beauty is indescribable; over the surface a light vapour curls. In the depths the steam is a bluish white, and tints with its own has the fantastic incrustations on the cistern walls; while at the bottom is observed the month of the once mighty Geyser. There are in Iceland traces of vast, but now extinct, geyser operations. Mounds are observed whose shafts are filled with rubbish, the walls having forced a way underneath, and retired to other scenes of action. We have in fact the Geyser in its youth, manhood, old age, and death, here presented to us—in its youth as a mere wave; in its manhood, as a fully-drilled, stately cistern; in its old age as the tranquil tube, while its death is being marked by the ruined shaft and mound, which testify the fact of its once active existence.

"Next to the Great Geyser the Strokkur is the most famous eruption of Iceland, and is situated not far from the town of Haukadal. It is not however cylindrical like that of the Geyser, but funnel-shaped. At the mouth it is 8 feet in diameter, but it diminishes gradually, until near the centre the diameter is only 1 foot. By long stones and pebb into the tube and thus stopping it, eruptions of water are produced. The "inches of height often exceed those of the Great Geyser. Its action was illustrated experimentally in the lecture, by stopping the galvanised iron tube before allowed to locally with a cork. A jet of water was forced up and the pent-up heat converting itself suddenly into steam, the water was ejected to a considerable height—thus demonstrating that in the tube the alone is the sufficient cause of the phenomenon." ('Proceedings of Royal Institution.')

The results of the researches of Professor Bunsen on the Geyser of Iceland seem to throw great and unexpected light on the phenomena of volcanoes. Sir Charles Lyell closes his account of Bunsen's researches with the following remarks:

"In speculating therefore on the mechanism of an ordinary volcanic eruption, we may suppose that large subterranean cavities exist at the depth of some miles below the surface of the earth, in which molten lava is stored, and by heat and pressure of the air contained into these, the steam thus generated may press upon the lava and force it up the duct of a volcano, in the same manner as a column of water is driven up the pipe of a Geyser. In other cases eruption takes place by a continuous flood of molten lava, accompanied with red-hot water (for water may exist in that state, as Professor Bunsen reminds us, under pressure), and this column may have a temperature regularly increasing downwards. A disturbance of equilibrium may first bring on an eruption near the surface, by the expansion and conversion into gas of entangled water and other constituents of what we call lava, so as to occasion a diminution of pressure. More steam would then be liberated, carrying up with it jets of melted rock, which being hurled up into the air may fall in the form of ashes or ash-cinders. This is naturally followed by the arrival of lava and water more and more heated at the orifice of the duct or crater of the volcano, expansive power may be acquired sufficient to expel a massive current of lava. After a period of time long sufficient for the quiescence succeeds, during which fresh ascensions of heat are communicated from below, and additional masses of rock fused by degrees, while at the same time atmospheric or steam-water is descending from the surface. At length the conditions which are necessary to cause a renewed eruption returns in that place, the cycle of similar changes is renewed." ('Principles of Geology,' p. 565.)

GIGANTOLITE. [Mineralogy, 8.1.]
GIIBERTUITE. [Mineralogy, 8.1.]
GIOBERTI, VINCENZO, was born on the 5th of April 1801, in the city of Torino (Turin), the capital of the kingdom of Sardinia. He studied with a view to the ecclesiastical profession, and having completed his education in the University of Turin, received the degree of Doctor of Theology, and became one of the teachers in the theological college. Soon after the accession, in 1831, of Charles-Albert to the throne of Sardinia, Gioberti was appointed chaplain to the king, and continued to perform the duties of that office till 1833, when, on some accusation or suspicion of being implicated in the political agitations then prevailing in various parts of Italy, he was suddenly seized in the apartments which he occupied in the palace, and imprisoned in the citadel, where he was kept for several months under the pretence of being held at liberty on the condition that he quit the country as an exile. He went to Paris, where he resided till the end of 1836, when he removed to Brussels, having accepted the offer of a situation as teacher in one of the public colleges. Gioberti wrote at Brussels, during his long abode there as an exile, nearly all those works which not only extended his literary reputation throughout the whole of Europe, but procured that enthusiasm of admiration which was displayed by the Italians after his return to his native country. The first of these works was the 'Teoria del Sovrannaturale, o Discorso sulle Convenienze della Religione Rivelata con il Progresso Civile delle Nazioni,' 1837. His next work was the 'Introduzione alla Storia Politica,' 1838, and the 'Lettere intorno agli Errori Filosofici di Antonio Rosmini,' 3 vols., 1840-41; and the two treatises 'Del Bello,' 1840, and 'Del Bello,' 1843. His 'Pramato Morale e Civile degli Italiani,' 1845, was read with eagerness in every part of Italy, and the criticisms of them of the publication of that unfortunate country, which, with the sole exception of the Sardinian kingdom, have not hitherto been realised. There was to be a confederation of the Italian states, in which the faithful would perish, the nation, which was not to drink the cup of salvation, and the monks and Jesuits, were all to play their part. The states were to be reformed, and popular rights and privileges gradually established. The pope was to be the religious head of the confederation, and Rome the capital of the Empire: King of the peasants, and the king of Turin the grand cedzar. The Jesuits alone were disapproved, and Gioberti
attached them in his "Prolegomeni," 8vo, 1843. In 1848,
he ascended to the pinnacle of his career in 1848, adopted the views of
Gioberti, and began to carry out the reforms recommended in "Il Primato;" and as the opposition of the Jesuits still con-
tinued, Gioberti produced his great attack on their principles and
practices, under the title of "Il Gesùsita Moderno," 5 vols.
8vo. 1847.
When the French revolution of February 1848, occurred,
Gioberti was at Paris occupied with his plans for the renova-
tion of Italy. On the 20th of April he quitted Paris, after an
exile of fifteen years, to return to his native city of Turin,
whence his escape was welcomed by a display of banners in
day, and illuminations and fireworks at night, accompanied with
music and dancing and patriotic songs; and afterwards when he passed through Milan, Genoa, Florence, Rome, and
other cities, he was everywhere received with the greatest
enthusiasm, so that his journey resembled a triumphal pro-
cession.
On his return to Turin he was elected a member of the
chamber of deputies, of which he was unanimously chosen
president. He was opposed to all violent reforms, but the tide
of political excitement in the year 1848 threw him into the
ranks of the opposition, and on the 16th of December the
king appointed him the prime minister of a democratic
administration. He soon found himself to be in a false position,
and the difference of opinion between himself and the
ministers, who were largely inspired by Caracciolo, brought
on February 1849. He was succeeded by Pinelli, and soon after-wards was sent to Paris to solicit aid from the French govern-
ment in the approaching contest with Austria. His mission
was of short duration: Charles-Albert defeated at Novara, and Victor-Emmanuel II. has, alone, of all the rulers of Italy, preserved for his subjects a constitutional government, a free press, and a just adminis-
tration of the laws. Gioberti remained in Paris, and the fruit
of his political labours was, in 1851, "Memorie sulla forza
Civile d'Italia," 2 vols. 8vo, 1851. He died October 26, 1862,
in Paris.

GIARDAI, MADAME DELPHINE DE, the wife of
Emile Giaradin, and daughter of Sophie Gay, a literary lady of
reputation, well known in the literary world from the begin-
ning of the 19th century. She was what is called a precocious genius, and at the age of fourteen was noted for her remarkable beauty. In 1833 a poetical elegy of hers, containing all the illustrious names of the day, was honourably mentioned by the French Academy. On the 20th of April 1848, she was received with great
enthusiasm in the Capitol of Rome by the Académie du Trône, as one of their members. She received a more flattering ovation in Paris, on her return. The artist Legros, who had recently completed the new frescoes in the church of Madie. Delphine Gay to a place of honour beneath the dome, whence she recited some of her own poems in the presence of a brilliant assembly. As soon as she finished a shower of wreaths and bouquets were thrown at her feet. King Charles X. and Legros, in person, collected the petals of the roses. Shortly after, she met with M. Emile de Giaradin, to whom she was married in 1831.

Immediately after this union Madame de Giaradin engaged in
a variety of literary undertakings, producing novels, romances, and
fugitive poems for the booksellers; tragedies, comedies, and
vaudevilles for the theatres; and feuilletons for the
newspapers. Her charming "Leçons Parisiennes" appeared in the journal "Le Presse," under the name of "Vau de G.," by Mlle. Legros. Her novel, "La Reine," was recommended by Radcliffe, and another,
"Le Carné de M. de Balzac," 1838; "L'Ecole des Journalistes," a five-act comedy, 1840; "Judith," a tragedy, 1842; "Cléopâtre," a tragedy, 1847; "Lady Tartuffe," a comedy which produced much sensation, 1849; and "La Jeste,
Sainz," 1847.

GIADOLUS, Cerc-Flag from 'gladius,' a sword, refer-
ring to the shape of the leaves), a genus of plants belonging to the natural order Rosaceae. It has a tubular 2-lobed corolla; several petaloid petals arranged in a spiral; and seeds with an aril; root a coated bulb; leaves en cauliform, sheathing. The species in the gardens are bulbous, and are chiefly brought from the Cape of Good Hope.

G. sepium has about 3 flowers in one row; the anthers much shorter than the filaments. It is found in the
mountains of Carcass.

G. polisporus has 3 or 4 flowers, second; the tube twice as
long as the seed-vessel; the oval of the division curved
and remote; the lobes of the stigma papilloso-ciliate
almost from the base; anthers shorter than the filaments;
auricles at the base obtuse, parallel; capsules oblong,
ovate, rounded at the top, marked with six equal furrows.
It is found in Germany.

G. gummosea has second flowers; the filaments half
as long again as the anthers; the base of the division parallel; the tube half as long again as the genus; the lobes of the stigma gradually broader upwards, papilloso-ciliate
almost from the base; capsules 3-edged, ovate, impressed
with six equal furrows; it is found near Buxton and
Frankfort-on-Oder.

G. Illirica has second flowers; the tube three times as
long as the genus; division of stigma linear from the base
to the middle, and with a smooth margin suddenly enlarged
at the top; the capsule 3-edged; it is a native of Illyria.

G. infestus has a lax spike; flowers 4 to 14, obliquely
alternate; division of corolla alternately pink and purple;
uppermost very broad, covering the 3 lateral ones, the 3
lower unequal; anthers shorter than the filaments; seeds globose, prolonged downwards. It is a native of Sicily.

G. Bynanthus has numerous flowers in two rows; the upper
segment of the corolla covered by the lateral ones;
the 3 inferior petals the largest; the anthers longer than the filaments; seeds winged; leaves long,
entiform, and linear. Found in Sicily.

GLAND, a term applied to cells and collections of cells in
the animal body, which have the power of absorbing or
secreting substances. These cells are generally separated from
the circulating fluid. In one sense all the cells of the animal
act as glands; for they separate from the blood the peculiar
substances of which they are composed. The term gland however is only strictly applied to special forms of tissues which separate peculiar matters. "A true gland," says Dr. Carpeiser, "may be said to consist of a
clustered collection of follicles, all of which open into a
common channel, by which the product of the glandular
activity is collected and delivered. The follicles contain
the secreting cells in their cavities, whilst their exterior is in
contact with a network of bloodvessels from which the cells
draw the materials of their growth and development.

In a wider sense however the term gland has been applied
to those parts of the body which are engaged in the
work of generating and absorbing the food or carrying to the blood the materials of used-up
materials. [Ammonit.] In all cases the cell is an active
agent with the power of absorption or secretion. The agency of the gland in the body is seen in the way in which the chyle is
forested from the intestine and glands.

For further investigations on the structure of Glands, see
Tissier, "Omnino, S. 1., pp. 643, 643, 644. After describing the
development of glandular tissue, Professor Goodwin
concisely expresses his views on this subject with the following
remarks:

"It appears to be highly probable therefore that a gland
is originally a mass of nucleated cells, the progeny of one or
more parent cells; that the membrane in connection with the
embryo gland may ever; may, notwithstanding the case,
send a portion of the membranes in the form of hollow cones.
into the masses; but whether this happens or not, the
extremities of the ducts are formed as closed vesicles, and
through these they are for a time formed with the
parents of the epithelium cells of the perfect organ. Dr.
Allen Thomson has ascertained that the follicles of the
stomach and large intestines are originally closed vesicles.
This would appear to show that a cellular organ is the
original form of the gland, and the ducts the part of the
generative spot, which plays so important a part in its future
actions. The ducts of glands are therefore intercellular
passages. This is an important consideration, inasmuch as it
ranges the organology of the intercellular passages and
secreting receptacles of vegetables.

"Since the publication of my paper on the secreting
structures, in the "Transactions of the Royal Society of
Edinburgh," in 1844, I have satisfied myself that I was
erroneously in my supposition that the entire mass of the
cell-wall is opposed to the cavity into which the
secretion is cast. This accords with that most important
observation of Dr. Martin Barry on the function of the
nucleus in cellular development. I have also had an
opportunity of observing this, and to this result I add, at
the time fully anticipate—the remarkable vital properties
of the third order of secretion referred to in the memoir to
which I have just alluded. The distinctive character of
secretions of the third order is, that when thrown into the
cavity of the gland, they consist of ordinary cells, instead of
being the result of partial or entire dissolution of the
secreting cells. It is the most remarkable peculiarity of
this order of secretions, that, after the secreting cells have
been cast into the duct of the cavity, and no longer a
component part of the organism, they retain so much individuality of life as to
proceed in their development to a greater or less extent in their
course along the canal or duct; when they arrive at their
full extent of elimination. The most remarkable instance of
this peculiarity of secretions of this order is that discovered
by my brother. He has observed that the seminal secretion
of the decapods crustaceans undergoes successive develop-
mental changes in the duct of the body, and only becomes
developed into spermatozoa after coitus, and in the
spermatheca of the female. He has also ascertained that,
apparently for the nourishment of the component cells of a
secretion of this kind, a quantity of albuminous matter floats
around the cells which undergo development after separation from the walls of the gland.
This albuminous matter he compares to the substance which,
according to Dr. Martin Barry's researches, results from
the solution of certain cells of a brood, and affords nourishment to
their survivors. In one of other instances in which
cells do not derive their nourishment from the blood but
from parts in their neighbourhood which have undergone
solution, and it involves a principle which serves to explain
many processes in health and disease.

"I conclude therefore, from the observations which I
have made, 1st, that all the true secretions are formed or
secreted by a vital action of the nucleated cell, and that
they are first contained in the cavity of that cell; and, that
growth and secretion are identical—the same vital process
under different circumstances."

Having thus examined the nature of the process by which
the cell secretes, we may now refer to some of the more
prominent modifications of the organs called glands. The
simplest condition of a Gland is a solid mass, the secreting
membrane cast a follicle. These occur in the
skin, as in the sebaceous follicles, and also in the mucous
membrane of the stomach, where they are called gastric
follicles. The stomach occurs in the skin in the sub-epidermal
membrane covered with secreting cells. In the early stages of
the development of all glands we have this simple condition,
and in the permanent condition of the more complicated
glands, when occurring in the lower animals, we have the
same simple development. Thus the laries in some of the
Polyopes and lower Mollusae consists merely of a series of
separate follicles placed in the walls of the stomach. The
chick whilst in the egg presents the same condition of this
organ. The same principle is manifest in the development of a mammary gland in the Female.
The Ornithorhynchus this organ consists of a mere cluster
of blind sacs. In the same way many fishes the pancreas
begins its existence as a mere group of blind follicles.
The pancreas in the common carp is composed of a number of
follicles open into a single tube. Such a condition of the
organ is seen in what are called the Meibomian glands of the
eye. The larger glands of the body, as the pancreas, liver,
and spleen, pass through complicated stages of this
process. Innumerable follicles empty themselves into tubes
which again empty themselves into other tubes until the
whole contents of the gland are thrown out from some
common outlet.

GLAHORN, BRIGG. [Lincolnshire.]

GLAPHYRIA, a genus of plants belonging to the natural
order Myrtaceae. The limb of the calyx is 6-lobed, petals 5,
year 5-celled, many seeded; seeds fixed to the axis, 2 rows
in each cell. The species are small and rare; the annual
petals and cells of ovary 6 or 8 in number.

GLAUCINE. [Chemistry, S. 2.]

GLAD. (M. F. P.)

GLECHOMA. [Wat. S. 1.]

GLADIUM. [Chemist., S. 1.]

GLOBE-FISH. [Tetrodon.]

GLOBE-FLOWER. [Trollius.]

GLOIOSCLADIA, a sub-order of Sea-Weeds belonging
to the natural order Cryptonemiae. The fronds are loosely
gelatinous, the filaments of which they are composed lying
apart from one another, surrounded by a copious gelatin.
The favaellids are immersed among the filaments of the
periphery. It embraces the following genera:

Cruria.—Frond crustaceous, skin-like.

Noccaea.—Frond frilliform, solid, cellular; the ramuli only
composed of 2 to 3 cells, appressed

Glosotiphina. Frond tubular, hollow, the walls of
the tube composed of radiating filaments.

Nemalos. Frond frilliform, solid, elastic, filamentous;
the axis composed of closely packed filaments, the periphery
of the axis cambial, the ramuli elastic.

Doudremontia. Frond frilliform, solid, gelatinous, filamentous;
the axis composed of a net-work of anastomosing filaments;
the periphery of moniliform free filaments.

Cosmetia.—Frond frilliform, consisting of a pointed
filament, whorled at the points; minute minutifilament gelatinous
ramuli.

(Harvey, British Sea-Weeds.)

GLOSSOP, Derbyshire, a manufacturing town and the
seat of a Poor-Law Union in the parish of Glossop, is
situated on elevated ground rising from a deep valley near the
northern boundary of the county, in 53° 26' N. lat., 1° 55' W.
long; distant 49 miles N.W. by N. from Derby, 176 miles
N.W. by N. from London by road, and 193 miles by
the Great Northern and Manchester railway. The
population of the township of Glossop in 1851 was 5497;
that of the entire parish, which contains 49,960 acres,
and is the most extensive in the county, and
one of the most extensive in England, was 56,935.
The town is divided into two distinct districts, that of
Litchfield. Glossop Poor-Law Union contains 10 town-
ships and hamlets, forming a part of Glossop parish, with
an area of 30,707 acres and a population in 1851 of 19,560.

Of the larger towns, there are chapels for Independents and other Dissenters. A charity for
clothing 34 poor men and women was founded by Joseph Hugues, Esq. There is a savings bank. Molandra Castle, although Armadillo Castle in the town, is the site of a Roman station; the works appear to have been nearly square, 366 feet by 336 feet; the ramparts, parts of the ditch, and other portions may be distinguished. A Roman road called the Doctor's Gate runs from Melandra Castle to Brownsea.

GLOSSOPORIS, a genus of Animals belonging to the order Annelida, and placed commonly near the Leeches. It has a posterior disc, but it is not enterolitiferous.

GLYPTODON (Emmel, T.); GYPTODON, GLYCERIN (Curry, S.); TETES, OROANTO, S.1.)

GLYCERIN, a genus of Dorsibrachiate Annelida. It is distinguished by the form of its head, which terminates in a conical flaky horn-like point, which is divided at the tip into two stout and minute tentacles.

GLYCERYLE. [Chemistry, S. 2.]

GLYCOSINE. [Chemistry, S. 2.]

GLYPHYSODON, a genus of Acanthopterygious Fishes belonging to the family Scissurens. The gill-covers are entire, and they have a single row of tranchets and sometimes notched teeth. The species are found in the Atlantic, but are more abundant in the Indian Seas.

GLYPTODON (Owen, so named from the fluted character of its teeth), a genus of extinct Fossil Animals belonging to the order Edentata, and allied in structure to the modern Armadillos. The first notice of the discovery of the remains of a large edentate animal, similar to that of the Armadillos, was given by the late Sir George Owen, in his paper on the Megatherium, in the 4th edition of the 'Ossianic Fossiles,' published in 1823. This notice occurs in an extract from a letter addressed by D. Danisio Larramag, cure of Monte Vione, to M. Auguste St-Hilaire. The facts stated in this letter are as follows:--A femur was discovered in the Rio del Llanco, branche du Sanlis Grande, which weighed 7lbs.; it was short, but might be from 6 to 8 inches in width; it resembled in every respect the femur of an Armadillo, and bore the impression of bony armour, of which the remains was to send one of the component pieces to M. Auguste Geoffri. The tail was very short and very stout; it had in like manner a bony armour, but this was not verticillate or disposed in rings. These fossils were stated to have been met with near the surface of the earth, in alluvium or strata of transport, indicative of a very recent epoch. Similar fossils are said to occur in analogous strata near the Lake Nirum, on the frontier of the Portuguese colonies.

Requirements for a specimen to belong to the Megatherium, and Cuvier does not appear to suspect that they belonged to anything else, as he merely remarks that the Megatherium had pushed its analogies with the Armadillos so far as to fill up the same band with them.

Subsequently remains of this kind were sent to England, and in the meantime M. Laurillard and Mr. Pentland, on comparing those with those originally sent to England, came to the conclusion that they belonged to the genus Glyptodon. This however was doubted by Mr. Cuff and Professor Owen, seeing that the conformation of the alveoli of the jaw indicated a dentition differing more widely from that of the existing sub-genera of Armadillos than their respective dental characters differ from one another. It was at this conjuncture says Professor Owen, 'that Sir Woodbine Parham received the intelligence of the discovery of an entire skeleton, covered with its tesselated coat of mail, about 5 feet below the surface, in the bank of a rivulet near the Rio Matanza, about 30 miles from the city of Ayres; and having heard of this remarkable discovery the same time transmitted a drawing or sketch of the whole animal, which has since been lithographed, and one of the teeth of the fossil itself. This tooth Sir Woodbine Parham had purchased, and in his examination of it, he considered it to belong to an animal referrible to the Edentata of Cuvier; but its character was so peculiar that I had no hesitation in pronouncing it to differ from that of any known edentate animal, recent or fossil, and from its internal structure proved it to belong to the Armadillo family; for which I proposed the name of Glyptodon, in reference to the plate or sculpured character of the tooth.'

The Glyptodon differs from the Megatherium not only in the form and structure but in the number of its teeth, which appear to be eight on each side of each jaw, as in the section of Armadillos called Coccoauros by Cuvier. It differs from the existing Armadillos in the structure of the vertebrae; and it is characterized by the sinuosity of the process descending from the Zygom, in both which respects it resembles, and evidently indicates a transition to the Megatherium.

Numerous remains of this curious and interesting animal have been from time to time published; and the characters of the very fine specimen, with the cost of mail almost entire, is to be seen in the museum of the College of Surgeons. Portions of this animal are also to be seen in the collection of the British Museum.

Although, when the remains of the Glyptodon were first brought to Europe, it was not thought improbable that the Megatherium also was enclosed in a gigantic suit of armour, no remains that could be regarded as the tassess of such a covering has yet been discovered. It is always difficult, however, to establish a negative, but the following arguments have been adduced by Professor Owen against this supposition, and will be probably regarded by most naturalists as conclusive.

1. The opinion of Cuvier and Weiss, in favour of the Megatherium being so armed, rests on no better ground than the mere fact of bony armour of some gigantic quadruped and the skeleton of the Megatherium having been discovered on the same river as that of Glyptodon.

2. The skeleton, or its parts which have been actually associated with the bony armour above mentioned, belongs to a different and smaller quadruped.

3. No part of the skeleton of the Megatherium presents those modifications which are related to the support of a bony dermal covering.

4. The proportions of the component tassess of the bony armour in question to the skeleton of the Glyptodon, are the same as those between the dermal tassess and skeleton of existing Armadillos, but are vastly smaller as compared with the bones of the Megatherium.

5. No bony armour composed of tassess, having the same relative size to the bones of the skeleton of the Megatherium, as the Glyptodon and existing Armadillos, has yet been discovered.

6. The skeleton of the Megatherium has never been found associated with bony armour of any kind, neither have its parts been found associated.

(Owen, 'Proceedings of Geological Society,' vol. vii, 2nd series.)

GMELIN, LEOPOLD, was born at Göttingen on the 2nd of August, 1758. This eminent chemist and contributor to the literature of the science of which he was an equally noted exponent was born in Göttingen, where his family had for four generations been actively engaged in the pursuit of chemistry, the medical sciences, and several branches of natural history, and one member of which, if not more, is still so engaged. Among the eminent relatives who have already been noticed in the ' Penny Cyclopaedia,' is Johann George Gmelin, apothecary at Tübingen, who was born in 1764, and died 1726, had three sons, all of whom devoted themselves to chemistry and the allied sciences. The eldest Johann Conrad Gmelin (born 1707) was a physician and apothecary at Tübingen; his grandson, Christian Gottlob Gmelin (born 1792) is now professor of chemistry in the same university. The second is the subject of the article Gmelin, John George. The third son, Philip Friedrich Gmelin (born 1723), succeeded the last-mentioned in his professorship of chemistry and botany at Tübingen, and died there in 1766. His older son was Gmelin, Samuel Gottlieb, and his younger son Gmelin, John Faust, who succeeded him in that chair, and afterwards became professor of chemistry at Göttingen, was the father of the distinguished man we have now to commemorate.

Leopold Gmelin, from 1799 to 1804 attended the Lyceum in that city, and in the summer of 1804, his father's lectures on mineralogy. In the autumn of that year he went to Tübingen, where he practised chemical manipulation in the pharmaceutical laboratory of his near relation, Dr. Christian Osmal (the son of Johann Conrad Gmelin and father of Christian Gottlob Gmelin, both already mentioned), and attended Kilimann's lectures on chemistry. In the autumn of 1806 he returned to Göttingen, where he devoted himself with zeal to all branches of medical science, but especially to chemistry, for which he attended Stromeyer's lectures; he also studied mathematics. After passing a distinguished examination, he went, in the summer of 1806,
to Wurttemberg, and thence to Switzerland, which he traversed in all directions, hammer in hand. From the autumn of 1817 he remained in Tübingen, and set sail for his native city. In 1818 he again went to Vienna, where he visited the hospitals, and carried out, in Jacquin’s laboratory, the greater part of the experiments, which formed the basis of his Doctor-dissertation: ‘On the Black Pigment of the Eye,’ published in 1819, and afterwards in the tenth volume of ‘Gode’s’ journal. He left Vienna in the spring of that year, and went to Italy, where he remained till the spring of 1813, chiefly at Naples, but for some time also at Rome.

The observations and collections made in these journeys supplied the materials of the chemico-mineralogical investigations which formed the subject of his ‘Habilitationsschrift’ or thesis at Heidelberg, ‘On Hauny, and minerals related to it, together with geochemical observations on the montane mountains of Italy,’ published in 1814. On his way back to Göttingen he stayed some time at Heidelberg, where the professor of chemistry, George Sncow, being then recently dead, Gmelin was encouraged to give lectures on that science. Availing himself of the opportunity thus presented, he obtained the ‘venia docendi’ in Heidelberg, spent the remainder of the summer at Göttingen, making the necessary preparations for his new duties, and in the autumn of the same year began his career as an academic teacher in Heidelberg, which he subsequently pursued with zeal and success. Two years after he was appointed extraordinary professor of chemistry in the university. His celebrated ‘Handbook of Chemistry’ was then already begun. In the autumn of 1814 he went to Paris to examine the state of chemical researches in Vaquet’s laboratory. Two years afterwards he married Louise Maurer, the daughter of a clergyman of Heidelberg, and settled there, declaring the appointment of professor of chemistry at Berlin, whither he was invited in 1817, to be a great sacrifice. He returned to Göttingen in that year. He was soon afterwards made ordinary professor of medicine and chemistry at Heidelberg. In 1835, he declined an invitation to fill the chair at Göttingen, preferring to remain in his adopted home, although his residence there of more than thirty years would have been either at Göttingen or at Berlin. In the latter portion of his life he was so completely engrossed with the gigantic labour of preparing the fourth edition of his ‘Handbook,’ that he became quite neglectful of his health. In 1848, he had an attack of paralysis, which, though it only deprived him for a while of his power of action, destroyed the freshness and vigour of his manner, and elastically of his spirit. But he still worked at his ‘Handbook’ with untiring industry, and it was by such labours that his power, both mental and bodily, rapidly declined; an insidious disease of the brain was steadily gaining ground. In the spring of 1853 it became evident that his end was approaching, and he died on the 19th of April, in the sixty-fifth year of his age.

Leopold Gmelin’s original researches in chemistry are numerous; they are all of high character, and as complete as the means of investigation existing at the time when they were instituted would admit. In 1820 he undertook, in conjunction with Tiedemann, a series of experiments on digestion; and in 1826 and 1837 these two philosophers published their celebrated work, entitled ‘Die Verdaunung und Harnentwurf.’ But the greatest work to which he contributed to science,—‘a service in which,’ in the words of his friend and patron, ‘the society of St. Antony,’ ‘he surpassed all his predecessors and all his contemporaries’—consisted in the production of his ‘Handbuch der Chemie,’ the beginning and later progress of which have been described in the preface of this work. The first volume of his ‘Handbuch der Chemie’ (Series 1., Vol. 1., pp. 116, 1853) has been published, and is a work of much utility. Gmelin was elected a member of the Russian Academy of Sciences in 1823, and was awarded a medal by the Society for the Promotion of Useful Arts. He was also a member of the Royal Hungarian, Bohemian, and several other Learned Societies.

Gmelin’s ‘Handbook’ of chemistry, moreover, has often directed attention to deficiencies and contradictions in existing chemical knowledge, and has thus given rise to new investigations. It has also been useful in promoting an accurate knowledge of chemistry, not only in Germany, but wherever the science is cultivated. The first edition, which appeared in the years 1817-1819, included in a comparatively small space the extent of chemical science then known; the fourth, which was last prepared by Gmelin himself, was published from 1843 to 1858, and comprehends inorganic chemistry, but, unfortunately, only a small part of organic chemistry. From this the English edition, now in course of publication under the auspices of the Chemical Society, by the late Mr. Henry Watts, R.A., Fellow of the Chemical Society of London, of whose ‘Quarterly Journal’ he is also the editor. The additions made by him bring the ‘Handbook’ down to the existing state of chemical science. Dr. Thomson, desiring to make this work generally available to British chemists, was one of the motives which originally contributed to the establishment of the Chemical Society. The first volume was published at the end of the year 1848; the eleventh, forming the present ‘Handbook,’ appeared in 1857 (November). The translation is continued from a new German edition.

In the ‘Annals of Philosophy’ for August and September 1816, (Series 1., Vol. 1., pp. 116, 1853) a few months after its publication, Dr. Thomson published satisfactory abstracts in English of the Geological and mineralogical portions respectively. Of his dissertation on the black pigment of the eye, Dr. Thomson gave a short account in the same work for January 1818 (Vol. 7., p. 44.) in which Gmelin’s examination of the link of the cuttle-fish, which he had found to possess nearly the same properties with the black pigment, is compared with Dr. Prout’s, then recently published.

[Note: The rest of the text is not transcribed due to the limitations of the task.]
own productions, and it is said that in composing a dialogue, it is his habit to write letters to letter before committing them to paper, by means of which he ascertained more satisfactorily if they were in complete consonance with what the character and situation required. He soon tried his powers in the drama, and his comedy of 'The Reviewer' was highly applauded. As an expert reviser in Russia is the title of a high government officer dispatched to a province to ascertain and report on the character of its administration. The plot and the moral of the play, is, that an impostor who makes his appearance at a provincial town, where he is to be the judge in a case, but has to leave the town. The Russian liberal party, which affixed to it a deeper significance than to a foreigner appears altogether just, and considered it an open and serious attack on the institutions of Russia in general. That it was not lost upon this light by the government seems sufficiently proved by the appointment of Gogol as professor of history at the University of St. Petersburg, where it was his intention to devote himself to more serious studies. His next work however was a dramatic production, 'The Dead Souls' ('Pokinokhodniya Chichagova ila Mertvuiya Dushi'), published at Moscow in 1842. The English public has an opportunity of forming an estimate of this, the principal work of Gogol, as an English translation of it appeared in 1842, entitled 'The Dead Souls.' The author, 'Noble,' falsely declared in the preface to be an unpublished novel, originally written by a Russian in the English language. The style of the English version is indeed remarkable good; but the main strength of a novel lies in the plot and characters. The hero of 'The Dead Souls,' like the hero of 'The Revisor,' is a daring impostor, who goes about to a number of country gentlemen to persuade them to sell to him the land of their estates, which they are technically called in Russia, their 'dead souls,' for the purpose of obtaining an advance from government as the proprietor of a certain number of serfs—the names of the dead not being for a certain period struck off the records. Some of the characters introduced in the tale are certainly sketched with vigour, but in no other production of Russian literature is the foreign reader so much at a loss to detect the charm which has excited the enthusiasm of the native critics. The praises which were lavished on the original may be suspected of having their origin partly in political feelings.

Soon after the appearance of the book which raised his fame to its highest point, the author, whose health was bad, obtained leave of absence, and never returned to Petersburg until the time of the publication of 'Select Passages from N. Gogol's Correspondence with his Friends' ('Vulbramyinya Miesta a Perepikti i Druzami'), St. Petersburg, 1847, 8vo. From the height of popularity this publication sunk him at once to the lowest depths of contempt. His liberal friends found with surprise that the satirist of Russia, when at home, had become the panegyrist of Russia, autocracy and all, when beyond the frontier. Belinsky, who was one of the principal, attacked him fiercely in the 'Sovremennik,' one of the leading reviews in St. Petersburg, in an article which could hardly have been expected to pass the censorship. Gogol addressed him a letter of remonstrance, protesting that the change which had taken place in his opinions was the result of conviction produced by reflection. He describes himself, why the laying of a cornerstone, had himself obtained permission to leave Russia, addressed to him from his sick bed at Salzbrunn one of the most terrific hurling letters to be found in the whole annals of literature, and which was first printed, with the name of the author, 'Zrieds,' or 'Polar Star,' a Russian periodical issued in London in 1855. "Yes," explains Belinsky, "I loved you with all the passion with which a man warmly attached to his country, can love its hope, its honour, its glory, one of its great passions; in the path of self-communis, development, and progress. You had good cause indeed to be shaken out of your repose of soul, for a minute at least, when you lost the right to such love as this. I do not speak thus because I consider any feelings of mine an adequate recompense for such genius as yours; but because in this respect I do not stand alone, but represent a multitude of whom neither you nor I have been the majority, and who have never seen you." "Yes," replied the author, the friend of the Revisor and the Dead Souls,—can you, sincerely, and from your soul, raise a hymn of praise to the disgusting Russian clergy, placing it immeasurably above the clergy of the Roman Catholic Church?" 'The other' was sometimes something, while the former was never nothing but the lackey and slave of the secular power; but is it possible you do not know that our clergy stands in the lowest degree of contempt with Russian society and the Russian people? The clergy of the other Church, and every Russian the representative of gluttony, meanness, servility, impudence! . . . . I will not dilate on your diatribes about the bond of affection between the Russian nation and its rulers. I will only say that this diatribism was met with restraint, and that for the present eyes of persons who in other respects are very close to you in the direction you are taking, I leave it to your conscience to intoxicate itself with the divine beauty of Antichristy; only continue to have the good sense to reserve from it any reasonable distance,—when near, it is not so beautiful, and is apt to be dangerous. . . . You placed yourself too high in the opinion of the Russian public for it to be able to believe in the sincerity of such convolutions as this. What poet, what novelist, what editor, may seem more Russian than Gogol? By your gestures, your 'Noble,' you make your self-consciousness, which is, according to the Russian idea, the man of genius." Belinsky goes on to accuse him of views of personal ambition, and touches with bitterness on a passage in the 'Perepikti,' in which Gogol had appeared to speak with humility of his own works, and to intimate that he did not consider them as forming 'dead souls.' "You have made more noises with your publication than the case required; but after all, their enthusiasm sprung from so pure and noble source that it is impossible to regard them altogether unbecoming in you to surrender them up in the face of their enemies and yours, and to accuse them into the bargain of attributing a wrong meaning to your productions." The reply of Gogol to this bitter dictate is singular, "God knows," he writes, "there may be some truth in whatever you say, and it may be an established truth—that I do not know Russia—that much has been changed in it since I left, and that I must almost begin to study it anew to know it now. The inference I draw from this for myself is, that it behoves me not only not to print new sketches of life, but even two lines on the subject till I have returned to Russia, have seen it with my own eyes, and touched it with my own hands." Neither Belinsky nor Gogol ever returned. Belinsky died in France in 1848, after the Russian revolution of February 1848 had hailed as the dawn of an era of liberty, and Gogol, whose last letter is dated from Oterden, in August 1847, soon followed him. His death is repeatedly alluded to in recent Russian publications, but we have not seen its real date stated.

GOLD, a metal so remarkably from other metals, with a very few exceptions, in the fact that it is found in nature in its metallic state. It is occasionally found mineralised by tellurium. Native gold is Monomeric, and occurs in cubes without cleavage, also in grains, thin laminae, and masses, sometimes biform or reticulated. The colour varies in shade, sometimes being a bright yellow, at others almost silver-white, from the quantity of silver with which it is mixed. It is very ductile and malleable. Hardness 2 ½ to 3. Specific gravity 18 to 20. It varies according to the metals alloyed with the gold. Native gold usually contains silver, and in very various proportions. The finest native gold from Russia yielded—gold 98-96, silver 0-16, copper 0-85, iron 0-08; specific gravity 19-99. At Columbus, 1849, discovered and only 45 per cent. of gold, with 26-45 per cent. of silver; specific gravity 12-666. This last is in the proportion of 3 of gold to 1 of silver. The following proportions have also been observed:—39 to 1, 3 to 1, 6 to 1, 5 to 1 and 1; and this is the most common; 12 to 1 also commonly found.

Copper is often found in alloy with gold, and also Palladium and Rhodium. A Rhodium Gold from Mexico gave the specific gravity 18-6 to 18-8, and contained 34 to 43 per cent. of rhodium. Iron pyrites are often found in alloy of gold by those inexperienced in ores. Gold is at once distinguished by being easily cut in slices and flattening under a hammer. The pyrites when powdered are reduced to powder; iron pyrites is too hard to yield at all to a knife, and copper pyrites affords a dull greenish powder. Moreover the pyrites
give off sulphur when strongly heated, while gold melts without decomposition.

Native gold is in a large extent obtained from alluvial washings. It is also found disseminated through certain rocks, especially quartz and talcose rocks, and is often contained in pyrites, constituting the amorphous pyrites; the detritus affording gold-dust has proceeded from some gold-bearing rocks.

Gold is widely distributed over the globe. It occurs in Brazil (where formerly a great part of that was obtained), along the chain of mountains which runs nearly parallel with the coast of Vila Rica, and in the provinces of Minas Geraes; in New Granada, at Antioquia, Choco, and Grion; in Chili; sparingly in Peru and Mexico; in the southern part of the United States. In Europe it is most abundant, in Hungary, in the Alps, in Switzerland, and in the Pyrenees in Transylvania, at Kapnik, Vorospatak, and Offenbanya; it also occurs in the sands of the Rhine, the Renois, and the Aar; on the southern slope of the Pennine Alps, from the Simplon and Monte Rosa to the valley of Aosta; in Piedmont; in Spain, formerly worked in Asturias; in the county of Wicklow in Ireland; and in Sweden at Edsfors. In the Ural Mountains there are valuable mines, also in the Caucasus Mountains in Little Tibet. There are mines in Africa at Kordofan, in the Sahara, in the western part of Africa from Senegal to Cape Palmas; also along the coast opposite Madagascar, between 25° and 23° S. lat., supposed to have been the Ophir of the time of Solomon. Other regions in which gold is found are the same as in Japan, Formosa, Ceylon, Java, Sumatra, and the Philippines.

Until lately nearly all the gold of commerce came from Asia. Russian and Mexico, but recent discoveries of gold in California and Australia have opened new and vast sources of supply.

From 1600 to 1700 the entire supply of gold for Europe was obtained from America, whose mines are estimated in the one hundred years to have produced 337,500,000l. worth of the finest metal. During the 18th century the supply of gold and silver was still mainly derived from the Americas, the great mine of Valenciana producing 125,000l sterling per annum for 40 years, and the district of Zacatecas adding largely to the amount, although these were rapidly falling towards the end of the century. A great increase of gold was produced from the mines of Russia, which are still very productive; they are principally alluvial washings, and these washings seldom yield more than 52 grains of gold for 4000 lbs. of soil, never more than 120 grains. The alluvium is generally most productive where the loose material is more feruginous. The mines of Ekaterinburg are in the parent rock—a quartz constituting veins in a half-decomposed granite called Beresite, which is connected with talcose and chlorite slates. The sands are deposited in the bottoms of the rivers, seldom below 25 feet, and hence lateral galleries are run to the veins. These mines afforded between the years 1725 and 1841 6799 pounds of gold, or about 30,000 lbs. try. The yield of the mines in pounds of gold was 1842, 970 pounds of gold, or 42,000 lbs. try, half of which was from Siberia, east of the Ural. In 1843 the yield was nearly 60,000 lbs. try; in 1845, 69,000 lbs. try; and in 1846, 75,350 lbs.

In the five following years to 1851 nearly 296,632 lbs. try, weight of gold have been raised in Russia.

At the Transylvania mines the gold is obtained by mining, and these mines have been worked since the time of the Romans. The annual yield of Europe exclusive of Russia is not above 350,000 lbs. try. The sands of the Rhine, Rhad, and Danube are full in small quantity, and the sands of the richest quality contain only about 56 parts of gold in 100,000,000. Sands containing less than half this proportion are worked. Africa yields annually at least 40,000 lbs. try, and Southern Africa 1250 lbs. Try. For an account of the gold-region and gold-produce of California, see California, S. 2.

From November 1850 to June 1851 the Bank of England issued 9,500,000 sovereigns, being at the rate of 18,000,000 a year, and so great is the increasing demand for gold coins, that the Bank was scarcely able to satisfy it.

It may be interesting to know, that from the account kept at the Bank when the light coin was called in, in 1842, that 12,000,000l. were received light, and 36,500,000l. still circulated. 20,000,000l. may be regarded as the proportion of gold coin in circulation, allowing 5 or 3 per cent. for the national wear of the coin.

In the year 1856 there were coined at the royal mint 4,506,100 sovereigns, and 2,951,300 half-sovereigns; total 7,457,400l.

A large quantity of gold is consumed every year in arts and manufactures, and thus generally removed from the stock of our circulating wealth. In Birmingham not less than 1000 oz. of fine gold are used every week, and the weekly consumption of gold leaf is as follows:

<table>
<thead>
<tr>
<th>Country</th>
<th>Gold Leaf Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>London</td>
<td>400</td>
</tr>
<tr>
<td>Edinburgh</td>
<td>35</td>
</tr>
<tr>
<td>Liverpool</td>
<td>15</td>
</tr>
<tr>
<td>Manchester</td>
<td>40</td>
</tr>
<tr>
<td>Dublin</td>
<td>12</td>
</tr>
<tr>
<td>Glasgow</td>
<td>6</td>
</tr>
</tbody>
</table>

Total 584 weekly.

Of which not one-tenth can be recovered. For gold leaf use by the electrotype and the water-gilding processes, not more than 10,000 oz. of gold are required annually. One establishment in the Potteries employs 3000l. worth of gold per annum, and nearly 2000l. worth is used by another. The consumption of gold in the Potteries of Staffordshire for gilding is about 3000l. a year, and the paper dressing yields a rose-colour from 7000 to 10,000 oz. per annum.

The Indus and the Emperors were in the earliest ages the earliest spot which man obtained the precious metals, gold—Nubia and Ethiopia on the south, and Siberia in the north next open out to this precious treasure. The marriage of a prince of India to a princess of Persia was at this time a badge of wealth and high rank, and may be regarded as a badge of high rank, and in-viding human luxury. Europe then began to unfold her golden stores, and Illiyria and the Pyrenees, together with the land of the Hungarians and many parts of Germany to the Rhine, were sought successively for gold. Our islands yield little to the store, and the then New World of the Americans opened by Columbus a source from which the Old World was to supply its golden waste. On and on westward rolled the golden ball, until at length it rested in California, and the Aztec rush, equally to that seen El Dorado, and the man of China is found at the side of the English gold stream. Then, as if to double the girdle, the islands of the Pacific and our own Australia open their exceeding stores.

Australia is undoubtedly the most important gold-bearing district in relation to Great Britain. Her shores are now being crowded with emigrants from the mother country seeking the precious metal, and in proportion to her population she is now undoubtedly, in this point of view, the richest country in the world. [Australia, S. 2; Emigration, S. 2.]

For the purpose of guiding those who are seeking Australia on account of its gold, the professors of Natural Science, in the Museum of Practical Geology, delivered a course of lectures in the course of the past winter, the lectures were as follows:

1. 'The Geology of Australia, with Special Reference to the Gold Regions,' by J. Beete Jukes, M.A., F.G.S., Local Director of the Geological Survey of Ireland; author of Sketch of the Physical Structure of Australia.

2. 'On our Knowledge of Australian Rocks as derived from their Organic Remains,' by Edward Forbes, F.R.S.

3. 'The Chemical Properties of Gold, and the Mode of Distinguishing it from other substances resembling it,' by Lyon Playfair, C.B. F.R.S.

4. 'The Dressing or Mechanical Preparation of Gold Ores,' by W.W. Smith, M.A., F.G.S.

5. 'The Metallurgical Treatment and Assaying of Gold Ores,' by John Percy, M.D., F.R.S.

6. 'The History and Properties of Gold,' by Robert Hunt, Keeper of Mining Records.

We subjoin an account of the antiferrous rocks of Australia from the lecture of Mr. Jukes:

In Mr. Arrowmith's map, referred to the Parliamentary Report just issued, all the antiferrous spots are marked in yellow. They occur at intervals along the flanks of the Great Eastern Chain, or on its lateral spurs and subordinate ranges through an extent of country about 1000 miles in length, and as far to the south from London as to the coasts of Turkey, or as from London to Iceland in a straight line. The principal localities marked on this map are Glinton Range and Burnet River, north of the Condamine; Stanley Creek and Canning Downs in the Moreton Bay District; several spots in the neighbourhood of Liverpool Plains; the Turon and Conobolas on the Macquarrie, below Bathurst; the Abercrombie River at the head of the Lachlan; some spots...
on each side of Breadalbane Plains; the Braidwood and Arden diggings in the Shoalhaven district; Lake Eimee in the Australian Alps; and Ballarat, and Mount Alexander and Stawell, to the west of Port Phillip.

"In every one of these localities granite and metamorphic rocks occur, and quartz veins are frequently spoken of. This is an important fact to bear in mind.

"In scarcely any of them do we find mention made of the gold, although it is present, but in the drift clay, sand, and gravel, or lying loose on the surface of the ground. The kilometres of gold, indeed, found by Dr. Ker, north of Ballarat, is described as a block of highly auriferous quartz, lying and consolidated, evidently derived from a broad quartz vein running up the hill behind them. Such a mass, indeed, could hardly be transported far from its original site by any conceivable current of water.

"The superficial drift in which the diggings have been carried on varies in thickness from a few inches to 30 or 40 feet. The following is an extract from a letter given by a Mr. Gibbon, in Melbourne, and reported in the "Melbourne Argus", giving an account of the Ballarat diggings as—: On the surface of the earth was tief in a layer of about a foot thick, below which was a layer of rich black alluvial soil, and below that grey clay; below that again was a description of red gravel, which was sometimes very good; then red or yellow clay, in which gold was found; and then a stratum, varying in its thickness, of masses of those colours, and scarcely worth working; and the next stratum was of hard white pipe-clay, which was a decided barrier. Immediately above it was a thin layer of chocolate-coloured clay, tough and asopy. This was the celebrated blue clay, and was the source of the gold.

"The ground on which the diggings were situated was a sloping bank. The blue clay is found near the surface on the brow of the hill, that is, at the depth of about a foot; but its mass requires to dig 30 feet before arriving at it."

Mr. Labrooke, governor of Victoria, describes the Ballarat diggings as carried on through—

2. Streaked yellowish and red clay.
3. Fine gravels and pebbles, all transported in by the drift clay, and of a very fine gravel, that may be of use to those intending to emigrate there.

"In conclusion, I may perhaps be allowed to utter one word of advice.

"Gold-digging is very hard work—just such work as you see navigators at in a railway cutting, or brick-makers in a brick-pit. You must work hard all day, lie hard all night, with but little shelter, often with scanty food, and with nothing of what you have probably been accustomed to consider necessary. If you find you have no luck at the diggings, or if your health, or strength, or resolution fail you, do not give up or despond altogether. You go out to dig for gold; do not be ashamed to dig for anything else. Speak to those now who have been heathen massacred to mankind without labour. Recollect, it is the avowed object of your voyage, and the only thing you have to trust to. If you fail in digging gold there are lands to be ploughed, sheep to be tended and sheared, cattle to be raised, corn to be sown and tilled, a trade in one of those fully as honourable occupations as digging for gold. The gold, however, has been the result determined to get your living by the strength of your own arms and the sweat of your own brow; and be assured that industry and perseverance lead to fortune in Australia with very little uncertainty in the way than in any part of the world.

Since the above was written, other districts in Australia were yielded the precious metal, and every day is adding to our knowledge of the wide extension of this metal on the surface of the earth.

GOLD COAST COLONY. The Gold Coast is part of Upper Guines, but its boundary is not exactly determined. Geographers state that Cape Three Points (2° 20' W. long.) constitutes its northern boundary; but our navigators extend it farther west to the small river Afromous, which is nearly 70 miles E. from Cape Laho. On the east, the eastern mouth of the river Lagoe (4° 20' E. long.) is generally considered as constituting its boundary towards Benin, though the mouth of the Togo river is more distinguished by the name of the Slave Coast. In the interior are several fertile kingdoms of the Ashantees and Dahomey, on which most of the small states along the coast are dependent. According to the district, the coast is one of the most beautiful, and when the territory under British protection is to include about 8000 square miles of country, with a population of about 400,000. In a dispatch of April 18th, 1853, however, Governor Hill states that he considers his previous estimate of the population to be exaggerated, and that it is probably not more than 300,000. The revenue of the colony is derived from a government grant of 4000l. per annum, a duty of half per cent. ad valorem on all imports, and certain small fees. The income for 1853 amounted to 12,332l., the expenditure to 12,045l. The value of the imports for the year 1853 amounted to 60,000l.; the value of the exports for the same year amounted to 115,000l. The imports for 1854 amounted to 70,000l., and the exports for the same year to 200,000l. The chief articles of export are palm oil, gold, and ivory; they give in exchange fire-arms, iron, and iron-ware, tobacco, rum, Manchester cottons, and some other articles.

The whole of this coast being near 5° N. lat., is considered one of the hottest countries on the globe; yet the mean temperature is only 78°, and in the cold season the thermometer sometimes falls to 75° or 74°. During the Hamatson season, from the middle of December to March, which is the driest and coolest, the air often remains for weeks at 6° to 8° above zero, the thermometer being in some places as low as 17° below zero. The inhabited coast is constantly exposed to the gales and storms that prevail on the north-east. The great rainy season begins in March, and continues to the beginning of June. From June to the end of September is the warm season, which is the most unhealthy, the temperature being 85°, and occasionally a degree or two than at other times, and generate fever. In October and November showers of rain are frequent. Except during the Hamatson season, the winds blow from the west in the middle of the day, from 11 to 3 o'clock, but in the evening from south-west, and in the morning from north-west. The climate is in general unhealthy, especially to Europeans on their arrival. Every person is attacked by a fever, which is called the season. This fever in many instances proved fatal; but it is at this time that the administration of quinine has been found exceedingly useful in promoting the recovery of persons attacked by the fever.

Cape Coast Castle is the principal English fortress; it is situated in 5° 51' N. lat., 1° 18' W. long., and covers a considerable area. In it are apartments for the officers, and barracks for the private soldiers. There are some spacious warehouses. It is built on a rock close to the sea. Near it are the small outposts called Fort William and Fort Victoria. The town which is behind the fortress, is of considerable extent; it has about 10,000 inhabitants, and about 20 are Europeans. The streets are regularly arranged, but the houses are of mud, and huddled together. Within Cape Coast Castle is a government-school, which in 1822 was attended by 150 boys.

The other forts are Accra, Annamaboe, and Discove. Fort St. James at Accra is occupied by a small garrison. The native population is stated to be about 3000. The fort is situated on the coast in 5° 32' N. lat. 0° 12' W. long., and the station is regarded as among the most healthy. The Gold
Coast. Two insurrections occurred at Accra in 1854. Service measures were then resorted to, and the second insurrection, near Accra, was the Dutch fort of Crevecoeur. About 3 miles E. from Accra is the fort of Christianborg, and about 30 miles N.E. from Accra is the fort of Fredensborg, both recently purchased from the Danes by the British government. The purchasing power on this occasion consisted, besides arms, gunpowder, spirits, and wines. Accrabeo has been noticed separately. The population is said to be about 4500.

The exports include the articles usually sent from this coast, namely, palm-oil, gold-dust, ivory, and grains, and the imports likewise. The trade is an entrepôt of commerce for Ashantee and the interior. Accra is situated in 4° 48' N. lat., 1° 47' W. long. The native population is said to consist of vessels of 100 tons in their cargoes. The native population inhabiting the town is about 1800.

The introduction of civilizing influences to the native population of the Gold Coast, is chiefly owing to the labours of the Wesleyan missionaries. From the despatches of successive governors of the colony, addressed to the Secretary of State, it appears that considerable progress has been made in communicating to the natives the benefits of an educational and industrial training. In the year 1832, the population of the Gold Coast was stated at 6000 persons, and about 1200 children were in attendance at the schools of the mission. Mr. Freeman, the missionary superintendent, established in 1831 an industrial school and gave Demonstrations of the art of making Iron, Castle. In February 1852 there were 28 native youths under training at this establishment. On December 31st 1852 Mr. Freeman, writing to Governor Hill, says, "We have now about 750 wines and 6000 coffee-plants. The roads in the establishment, are being worked, and believe there it is well. The Missionary Society expends about 500L. a year on the Gold Coast Mission. Among other evidences of advancing civilization may be noticed the erection by the natives of many new cottages for the residence of the missionaries. This is the first sign of the native's aspirations to the amenities and comfort of civilized life. European dwellings, and the construction of several good roads to facilitate communication between the towns and villages in the interior. The roads have been constructed voluntarily by the natives under the direction of the missionaries. These encouraging features have been more particularly noticeable in the neighbourhood of Abakrampa, the capital, and Domonei, the second town of the Abrab tribe and district, in the Cape Coast territory. In some of the principal towns of the interior, the houses for Christian worship have been built by the chiefs at their own expense.

Governor Hill has endeavoured to enlist the sympathies and co-operation of the native chiefs, by forming them into a body of the highest authority, including a council, with an executive at its head. Each chief has agreed to pay a poll-tax of Ls. yearly for each person belonging to his tribe: from the fund thus provided each chief is to receive a stipend to support the dignity of his position, and from it is to be defrayed the cost of such general measures of improvement as the legislative body may agree to undertake. Besides the school at Cape Coast Castle, already noticed, the Governor has recently established one in the interior, which in April 1853 had 54 scholars, and proposes to establish schools at such places within the range of his government as have not been already supplied by the Wesleyan body. He has also employed the natives composing the Gold Coast corps, numbering 335 non-commissioned officers, rank and file, engaged in the work of polishing, giving them the opportunity of attending the regimental school when they can be spared from other service. In this way many members of the corps have made considerable progress in reading, writing, and a knowledge of the mechanical arts. By their labours 40 miles of a military road has been opened through the Assin country, directly into the interior towards the capital of Ashantee; and a fine carriage-road to Accrabeo was in process of construction in April 1853. On this road a large number of natives have been employed, and at the entrance to the town, the granite for which had been first quarried by the soldiers from a deposit opened by them in the immediate neighbourhood.

Notes on Africa. — [Hutton, Travels in Africa; Adams, Remarks on the Countries extending from Cape Palmer to the River Congo; Monrad, Gemäldd der Künste von Guinea; Parliamentary Papers.]

GOODS. In actions for the non-delivery of goods, the plaintiff, if successful, may now have the same alternative judgment as in the action of assumpsit (S. 9); that is, either to have the goods themselves specifically delivered to him, or the value of them assessed by the jury. This most beneficial change in the law is made, and an appropriate writ of execution, to give effect to it, is inserted in the Magna Charta Law Amendment Act, 1855, 19 & 20 Vict. c. 97.

GOOLE. [Yorkshire.]

GOOSE-BRASS. [Gallium, S. I.]

GORGONIA, a genus of Animals belonging to the order Pneumatica, the modern name of the family Gorgonidea. It has the following generic characters:—Polypse-mass rooted, arboreous, consisting of a central axis backed with a polyporous crust; the axis homo, continuous, and it is of the same size as the crust when reduced; the crust when worn and slightly, when dried porous and friable; the orifice of the polype-cells more or less racemose. The species of Gorgonidea thus described are not numerous. Dr. Johnston enumerates four species as being found on the British coasts.

G. verrucosa, the Warty Sea-Fan, is somewhat fleshy, much and irregularly-branched, the branches cylindrical, flexuous, backed when dry with a white warty crust; segments of the cells unequal, oblong. This polype is abundant in the rocks of the southern coast of England. It lives in deep water.

G. pinnata, branched and pinnated, the branches compressed; polype-cells in regular rows on each margin, nearly cylindrical. The Warty Sea-Fan of Mr. Forbes was dredged by Mr. Forbes in the sound of Skye, where they found it attached to stones in 30 fathoms water.

G. placomus, irregularly branched, the branches disposed in a dichotomous order and a flatting form, cylindrical, with its short little mouths along both the margins. This is a rare species. It was found originally by its describer Mr. Dale, near Margate. It is of a violet colour when fresh. It is a doubtful native of our seas. G. fistulatum has been found on British coasts, but it has been undoubtedly accidental. (Johnston, British Zoophyta.)

GOTHITHE, a Mineral, to which also the name Lepidolite is given. It is a hydrousoxide of iron, differing from the brown iron-oxide by containing half as much water. The crystals are of a brown colour, and blood-red by transmitted light when sub-transparent. It has a hardness of 5, and its specific gravity 4 to 4.2. It is found with basaltic and andesitic rocks in Nassau, also in silica Turgite, from the Ural, seems to be identical. (Grainacée. [Grainacée.] The following list of British genera is from Buckingham's Manual British Botany:—

**Digitaria.**


*Alcyonea.* Schloehia. *Acorus.*

*Allypogon.* Descrip. *Aegiphila.*

*Cynodon.* Arundo. *Bromus.*


*Eryngium.* Leontodon. *Arctium.*


*Corynephora.* Echinocochloa. *Archerthemia.*

The family is very numerous. Pearson's *Synopsis* contains 812 species, 126th part of all the plants thereby enumerated. In the system of Rosier and Schulze here adopted, the arrangement of the order is more compact. The conclusion, would probably contain 40,000 in all, it may be assumed that the species form 22nd part of the whole. It is more than probable however that in future the number will increase in a larger ratio than the other phanerogamic plants, and this proportion will probably reach 1 in 4 to 16. Greater still will be their proportion to vegetation in general when the number of individuals is taken into account, for it
The tropical grasses acquire a much greater height, and occasionally assume the appearance of trees. Some species of **Bamboo**s are from 60 to 60 feet high.

The leaves of the tropical grasses are broader, and approach more in form to those of other families of plants. Of this the genus **Paspalum** affords many examples.

2. Separate sexes are more frequent in the tropical grasses. **Zea**, **Sorghum**, **Andropogon**, **Oryza**, **Achnatherum**, **Ileophila**, **Echinochloa**, and others all have separate sexes. In the northern temperate zones this condition never occurs in the torrid zone, and are there found in perfection, are monocious or polygamous. **Holcus** is perhaps the only extra-tropical genus with separate sexes.

4. The large grasses which are tall, and elegant.

6. The extra-tropical grasses on the contrary far surpass the tropical in respect of the number of individuals. That compact grassy turf, which especially in the colder parts of the temperate zones in spring and summer composeth the green meadows and fields, is almost entirely wanting in the torrid zone. The grasses there do not grow crowded together, but like other plants, more dispersed. Even in the northern parts of Europe the assimilation to the warmer regions in this respect is by no means inconsiderable.

4. A number of the tropical grasses, the Bamboo, **Buchnera Ruossaw**, **S. Tenerifer**, **Imperata arundinacea**, **Lepoglossus setus**, **Lycium aphyllum**, and the species of **Andropogon**, **Echinochloa**, &c., by separate sexes exhibit tropical qualities. The grasses are also less greasy, and meadow-swindom occur in the south than in the north of Europe. The generality are social plants.

The distribution of cultivated grasses is one of the most interesting of all subjects. It is determined not merely by climate, as in the case of wheat and maize, but also by the peculiarities of the people, and often on historical events. Within the northern polar circle agriculture is found only in a few places. In Siberia grain reaches at the utmost only to 60°, in the eastern parts scarcely above 50°, and in Kamtschatka the same. In all these regions, therefore, the bread-grain is unknown.

The polar limit of agriculture on the north-west coast of America appears to be somewhat higher, for in the more southern Russian possessions (57° to 58°) barley and rye come to maturity. Only in Europe, namely in Lapland, does the polar limit reach an unusually high latitude. Beyond this dried fish, and here and there potatoes, supply the place of grain.

The grains which extend farthest to the north in Europe are barley and oats. Those, which in the milder climates are not used for bread, afford to the inhabitants of the northern parts of Norway and Sweden, of a part of Siberia and Scotland, their chief vegetable nourishment. Rye is the grain which becomes associated with these. This is the prevalent grain in the northern temperate regions, namely in the south of Sweden and Norway, Denmark, and in all the lands bordering on the Baltic, the north of Germany, and part of Siberia. In the latter another very prevalent grain, buckwheat, is also much employed. In the zone where the prevalent wheat is generally to be found, barley being here chiefly cultivated for the manufacture of beer, and oats supplying food for the horses. To these there follows a zone in Europe and Western Asia where one finds barley freely furnished bread. The middle and the south of France, England, part of Scotland, a part of Germany, Hungary, the Crimea, and Greece, as also the lands of middle Asia, where agriculture is followed, belong to this zone. Here the vine is also found; wine supplies the use of beer, and barley is commonly less raised. Next comes a district where wheat still abounds, but no longer exclusively furnishes bread, rice, millet, and maize being also grown.

To this zone belong Portugal, Spain, part of France on the Mediterranean, Tunisia, the provinces of Asia Minor, further, the countries of the East, Persia, Northern India, Arabia, Egypt, Nubia, Barbary, and the Canaries; in these latter countries however the culture of maize or rice becomes more common. Here, and in some of them several kinds of **Sorghum** (Donra) and **Poa Alpina** come to be added. In both these regions of wheat, rye only occurs at a considerable elevation, oats however more seldom, and at last entirely disappear, barley affording food for horses and cattle. In the north the cultivation extends to the vegetable zone of the old continent, in China and Japan, our northern kinds of grain are very unfrequent, and rice is found to preponderate. The cause of this difference between the east and west, and between races and climates appears to be neither the manners and peculiarities of the inhabitants. In North America, wheat and rye grow as in Europe, but more sparingly. Maize is more reared in the western than in the old continent, and rice predominates in the southern provinces of the United States. In the torrid zone, maize predominates in America, rice in Asia; and both these grains in nearly equal quantity in Africa.

The cause of this distribution, without doubt, historical, for Asia is the native country of rice, and America of maize. In some situations rice is cultivated with equal facility in the tropics, wheat is also met with, but always subordinate to these other kinds of grain. Besides rice and maize there are in the torrid zone several kinds of grain as well as other plants which the inhabitants with food, either used along with them or entirely occupying their place. Such are: in the new continent, **Yams** (Dioscorea alata), the Manihot (Jatropha Manihot), and the Batatas (Convolvulaceae), the root of which and the fruit of the **Pisang** (Dioscorea Musa) furnish universal stores of food, and of some kind in Africa, **Doura** (Sorghum), **Pisang**, Manihot, **Yams**, and **Arthus hypogaea**; in the East Indies and on the Indian Islands, **Elaeis coromana**, E. striata, **Panicum miliaceum**, **Poa graminifolia**, and **Psathyrostachys**, the Sago, **Pisang**, **Yam** Beets, and the Bread-Fruit (Avicennia iacca). In the islands of the South Sea, grain of every kind disappears, its place being supplied by the bread-fruit tree, the pisang, and **Tacca pinnaflata**. In the tropical parts of Australia there is no agriculture, the inhabitants living on the produce of the sago, of various palms, and some species of **Arun**.

In the high lands of South America, there is a distribution similar to that of the degrees of latitude. Maize is cultivated in the southern parts of those countries, and in Van Diemen's Land. In New Zealand the culture of wheat is said to have been tried with success, but the inhabitants avail themselves of the **Acraciunum furnetum** as the main article of sustenance. Here also appears the contrast in the distribution of the growing kinds of grain, the earth may be divided into five great divisions, or kingdoms—the kingdom of rice, of maize, of wheat, of rye, and lastly of barley and oats. The first three are the most extensive; the maize has the greatest range of territory, the wheat the next greatest, and the greatest number of the human race,” Schomow, in Jameson’s ‘Philosophical Journal.’

The uses of this important tribe of plants for fodder, food, and clothing, require little illustration. The abundance of the productive parts of the different species, and their peculiarly well adapted for the sustenance of man; and if the Cereal Grasses only, such as Wheat, Barley, Rye, Oats, Maize, Rice, and Guineas corn, are the kinds commonly supplied, it is because of the large size of their grain compared with that of other grasses; for none are unwholesome.
in their natural state, with the exception of Lactium temu-
lentum, a common weed in many parts of England, the
effects of which are undoubtedly injurious, Bromus purus-
genes and catherines are said to be emetic and purgative; Bromus
mollis is also unhealthy, and Festuca quadrundens is
said to be poisonous; Molinia coerulea is injurious to cattle;
and some other species are supposed to affect the milk of
cows which graze upon them.
Among corn-plants not generally known may be mentioned
Eligia siliqua, called Natchez by the Coromandel coast,
and Nagla Rages, or Mand, evangelists in India; Sedum
Germanicum, yielding German millet; and Panicum frumen-
tacenum. There are many other species.

The value of grasses as fodder for cattle is hardly less than
that of other plants. The common fodder-grasses of Europe are
usually dwarf species, or at least such as do not rise
above four or five feet from the ground. The most
esteemed are Lactium perenne, Phleum, and Festuca pra-
tenis; Cynosurus cristatus, and various species of Poa
and dwarf Festuca. The fodder-grasses of Brazil are of far more
gigantic stature, and perfectly tender and delicate. In
Australia the favourite is Anthisuria australis, or Kangaroo
Grass; in India A. culta is also in request; but the most
common Indian fodder-grass is Durra, Doorna, or Hurry-
alee (Cynodon dactylon). Gama grass (Tripogon dactylon)
has a great reputation as fodder in Mexico; and attention
has lately been directed to the Tussac Grass of the Falk-
lands (Festuca fertilissima), a species forming tufts five or six
feet high, and said to be unrivalled for its excellence as food
for cattle and horses.

The fragrance of our sweet Vernal Grass is by no means
confined to it; other species possess the same quality, which
is connected with the presence of aromatic secretions, which
has led to its being recommended to the nostrils of medical
practitioners. Sugar is a general product of grasses. It
exists in great quantities in the Sugar-Canes (Saccharum
officinarum). Maize so abounds in it, that its cultivation has
been prosed in lieu of the sugar-cane.

For economical purposes Grasses are of much importance.
The strong stems of the bamboo are employed instead of timber and cordage. The citull of some species
contains silica, which occurs in large masses after the burning
of a hard rock, or a slice of hay; in the shape of a colour-
less glass mass.

(Lindley, Vegetable Kingdom; Babington, Manual of
British Botany.)

GRAYHOUND. [Locut.]

GREAT BRITAIN AND IRELAND. [Census of 1851, S. 2.]

GREECE, KINGDOM OF. The following table shows the
principal divisions, capitals, area, and population:

<table>
<thead>
<tr>
<th>Name</th>
<th>Capital</th>
<th>Area in 100,000</th>
<th>Population in 10,000</th>
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<tbody>
<tr>
<td>Northern Greece (Hellas)</td>
<td>1. Athens</td>
<td>68,975</td>
<td>695,000</td>
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<tr>
<td>2. Phthia and Patras</td>
<td>Lamia (Zalax)</td>
<td>60,988</td>
<td></td>
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<tr>
<td>3. Eleusis and Anemone</td>
<td>Mesogia</td>
<td>98,000</td>
<td></td>
</tr>
<tr>
<td>Peloponnesus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Argolis and Corinth</td>
<td>Nauplia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Achaia and Elida</td>
<td>Patra</td>
<td>116,767</td>
<td></td>
</tr>
<tr>
<td>6. Arcadia</td>
<td>Messene (Messina)</td>
<td>86,139</td>
<td></td>
</tr>
<tr>
<td>7. Messenia</td>
<td>Sparta</td>
<td>80,669</td>
<td></td>
</tr>
<tr>
<td>8. Laconia</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Islands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Euboea and North Sporades</td>
<td>Chalcis</td>
<td>64,921</td>
<td></td>
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<tr>
<td>10. Cyclades</td>
<td>Hermopollis (Syrac)</td>
<td>134,350</td>
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<tr>
<td>Total</td>
<td></td>
<td>25,385</td>
<td>900,373</td>
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</tbody>
</table>

GREEN IRON-EARTH. [Minerology, S. 1.]

GREENOUGH, HORATIO, American sculptor, was born in
Boston, United States, September 6, 1805. From his
earliest childhood he showed a great facility in drawing and
modelling, and his tastes were carefully cultivated; but it was
not until after he had been placed in academical training
that he began seriously to contemplate the adoption of
sculpture as a profession. Sculpture had then few prac-
titioners in America, and none of any mark; Greenough
that he proceeded to Rome in order to study the art.
Rome consequently furnished a residence for some years, and he
derived much professional advantage from the friendly serv-
ices of Thorvalden. His health however gave way, but it
was speedily restored by a visit to his native land. There
however he did not stay long. On his return to Europe he
remained long enough in Paris to execute a clever bust of
Lafayette, and then proceeded to Florence, where he fitted
up a studio, and where during a residence of several years,
his principal works were executed. Of these the most
important perhaps is the work which he superintended at
Washington, which now stands in the grounds of the Capitol at Wash-
ington, and the 'Rescue,' or, as it is sometimes termed, the
'Pioneer's Struggle,' now in the Capitol itself: both of these
works, so far as can be judged, are a harmonious union of the
timework of considerable originality and power, is intended to
ty the struggle between the native and European races,
and consists of a group of a pioneer rescuing his wife
and child from an Indian. Besides these he executed several
other works, and his intentions, whether poetical or
theorific, are always equalled by his workmanship. His
some very pleasing and graceful poetical figures and busts

He returned to America in 1851 to superintend the erection
of his group of the 'Rescue,' and eventually determined not
to again to return to Europe. But he had become imbued in
an Italian climate, and his constitution proved unable to with
stand the variations of an American one. After a severe
illness he died December 16, 1852.

Greenough will probably not ultimately rank among the
foremost of modern sculptors, but he is the one perhaps to
do doubt continue to occupy, a very respectable position;
while he will always retain a prominent place in the history of
American art as the first of his countrymen who obtained
an European reputation as a sculptor. Greenough's attainments
are generally attributed to the fact that he wrote both in verse and prose.
In private life, while
thoroughly unassuming, few men have been more esteemed.

GREENECKITE. [Minerology, S. 1.]

GREGAN, JOHN EDGER, claims notice as one of those who have contributed by their works to the
architectural improvement of the city of Manchester, where
great progress in art has been manifested during the last
twenty years. Gregan was born in Ireland; it is believed
at Dunmurry. He received an excellent general
education at Edinburgh, and acquired his first professional
knowledge from Mr. Walter Newall, architect, at Dunmurry.
About the year 1856 or 1857 he went to Manchester, where
he was for some time an assistant to Mr. T. Atkinson.
He then became an architect, who may be said to have commenced the
improvement which has been referred to. Mr. Atkinson left
Manchester in the year 1840, when Gregan commenced prac-
tice on his own account, and wholly by merit and experience.
His prominent position include several churches and schools in the neighbourhoods of Man-
chester, Bolton, and Preston, and the chapel of the Diocesan
Training School at Chester—these being in the medieval
style. He was the architect of St. John's Presbyterian
Churches at Green-Heys and Ancoats, school to the latter, and the Jews' school at Cheetham Hill—all of
the style of Northern Italy; several private houses at Man-
chester and neighbouring towns; warehouses (the class of building
which the character of Manchester is expressed) the lodges to the public parts of
the same city, and other buildings. His best work however, and it is of great merit, is the bank of Sir Benjamin Heywood,
Bart, and Co., of which an illustrated account may be found in the 'Builder' (vol. vi.), where also is a few, or an elev-
ton, of one of his warehouses (vol. viii.). The bank is de-
signed in an adaptation of the Venetian Italian style—
with careful attention to beauty of detail. The new 'Mechanical
Institute,' which Gregan, from his being a Fellow of
the Manchester Royal Institution, and took great interest in the local School
of Design, the establishment of the Free Library, and other
institutions. He possessed a cultivated taste in general art,
was an accomplished amateur chemist, and was a skilful performer
on one or two musical instruments.

GREGORY XII., Mauro Capellari, was born September 18,
1785, at Belluno, in the Lombardo-Venetian kingdom.
He entered at an early age into the Camaldolese order
and was elected their vicar-general. On the 21st of March 1823, Leo
XII. created him a cardinal, and soon afterwards appointed him prefect of the college De Propaganda Fide. Under Pius
VIII. He conducted the negotiation on mixed oaths with the kingdom of Prussia, and was the author of the celebrated pamphlet opposing the Emperors. He was elected pope, and crowned on the 6th of February. In honor of the founder of the college de Propaganda Fide, Gregory XV., he assumed the name of Gregory XVI. He was a man of respectable character in private life, but his criticism of the great theological questions of his time led to his exclusion from his temporal government harsh and despotic. In the early part of his reign he called the Austrians to suppress the disturbances which had broken out in the Legations, and his pontificate was considerable for the suppression of these disturbances in his subjects. He died June 1, 1846, and was succeeded by the present pope, Pius IX.

GROTEFEND, GEORG FRIEDRICH, a distinguished philologist and antiquarian, was born at Münden in Hanover on June 9, 1770. He was educated in his native town and at Hildesheim till 1796, when he proceeded to Göttingen, where he became intimate with Heyne, Tychsen, and Heeren. On the recommendation of Heyne he was appointed in 1797 assistant teacher in the Göttingen town school; and after he had made himself known by his work "De Paigraphia sive Scriptura Ebraica," which was done under the direction of Dr. Siemens, he became director of the Gymnasium of Frankfurt-on-the-Main in 1803, and shortly afterwards con-rector. Besides many learned contributions to the Allgemeinen Cyclopedia of Ersc and Grüber, and to other periodical works, he published in 1817 his celebrated "Handbuch des vergleichenden Lateinischen," and founded in 1817 a society for the investigation of the German language. In 1821 he was called to be director of the Lyceum at Hanover, which thenceforth became his residence. In 1822, he published an enlarged and reprinted edition of his "Lateinische Grammatur" in 2 vol. 4to, and a smaller one for the use of schools in 1822. His most noticeable works however are those relating to the deciphering of the eastern cuneiform inscriptions, on which he expended much and apparently directed labour; and those devoted to an investigation of the old Italian languages and geography. Among these works are his 'Nemén Beträge zur Erläuterung der Persepolitanische Keilschrift.' (New Contributions towards the Explanations of the Persepolitan Cuneiform Inscriptions), 1827; and 'Neme Beiträge zur Erläuterung der Babylonische Keilschrift,' 1840. For early attempts these works possessed considerable merit, but their value has been lowered by the indefatigable labours of more recent investigators. The first public notice of these productions was given between 1835 and 1838, "Rudimentos Lingae Umbriæ ex inscriptionibus antiquis edita," in 1839 "Rudimentos Lingae Oscae," 'Die Münzen der griechischen, persischen und indoscythischen Königre von Bactrien und Gandhara,' and 'Eroten, Nomada, and Indo-Sythian kings of Bactria and of the Countries on the Indus; and in 1840-42, in five parts, his investigation 'Zur Geographie und Geschichte von Altitalien,' a work remarkable for the copiousness of its materials and the bold felicity of many of its theories. The part he took in the controversy respecting the genuineness of Sanchunianthos' 'History of the Phœnicians,' has been already mentioned. [Sanchuniathon.] Grotefend has also published a history of the Lyceum at Hanover. He died December 16, 1849.

GROUCHY, EMMANUEL, COMTE DE, Marshal and Peer of France, was born in Paris, October 23rd 1786. He entered the artillery branch of the army in 1780. He was attached to the corps of horse, 1794, and in the course of the ensuing year, became one of the gardes-du-corps of Louis XVI. However, no sooner did the first dawn of the revolution appear than he quit the gardes-du-corps and ardently embraced revolutionary principles. In 1796, he was made colonel of the 2nd regiment of dragoons and next year he became major-general, and was appointed to head the cavalry attached to the army of the Alps. In that campaign Savoy was conquered by Montenquieu and annexed to France, General Grouchy having mainly contributed to the rapidity of this conquest. In 1797, a year already to be esteemed the first cavalry officer in the French armies. In 1793 he was ordered to join the army of the Côtes de Brest in La Vendée, relieved Nantes, besieged Chazotte, and by his skilful maneuvres at the head of the vanguard in the last wing he arrested the progress of the insurrection, pre-
26, 1814, at Le Rothière, February 1, and at Vauxolph, February 14. His bravery and skill, at this last battle, rang throughout all France; the auger of Napoleon, which had lasted ten years, gave way before it, and Grouchy was carried away.

After the battle of Ligny, June 16, 1815, Marshal Grouchy was commissioned to pursue the retreating army of Blucher with a force of 34,000 cavalry, and 100 pieces of cannon. In consequence of these orders, he found himself posted at Wavre, opposite to the position of the Prussians, and the French general Thielmann, whilst Napoleon was fighting at Waterloo, on the 18th. The marshal heard the report of artillery, and was strongly urged by his lieutenant-generals to make a personal sortie to the point, where he declared himself bound to obey the orders he had received from the emperor on the 17th. Fatal as the battle of Waterloo proved to the French arms, nothing was publicly said at that period against Grouchy's conduct, nor for three years after. After the second abdication of Napoleon, the provisional government appointed the marshal to the uniformed command of all the corps of the grand army; but the entire muster only amounted to 45,000 men.

Bunzfist from France, after the return of Louis XVIII, he withdrew to the United States, where he was living in 1816, when the narrative of the battle of Waterloo, dictated to General Gourgaud, at St. Helena, was published. In this account a charge of treachery was made for the first time against the marshal, who declared he had returned to France to assist in the revolutionary uprising. He was reinstated in all his titles and honours in 1821, by Louis Philippe, and died at Saint-Etienne, May 29, 1847, having been sixty-seven years in the French armies.

GROUND IVY. [Nawara, S. 1.]
GUACALATE. [Nawara, S. 2.]
GUANINE. [Nawara, S. 2.]

GUATEMALA, Republic of Central America, occupies the table-land of Guatemala, with the hilly country between it and the Gulf of Honduras, and a portion of the table-land of Yucatan. It lies between 24° 40' and 19° 10' N. lat., 81° 15' and 93° 30' W. long. On the S.E. it is bounded by the Republic of Salvador; E. by Honduras; N.E. by the Gulf of Honduras and the British settlement of Roatan; W. by the Atlantic; W.S.W. by the Gulf of Yucatan; W. by Chiapa; and S. by the Pacific Ocean. The area is about 50,000 square miles; the population about 600,000.

Coast-line Service, A.—The general bearing of the Pacific coast from the Salvador boundary of the State to the Barra de Guacalate in W. by N., and thence to the Rio Sintalapa, the boundary between Guatemala and Chiapa, it is N.W. The shore is for the most part low, the descent from the land to the sea being abrupt, and a strip of lowland, from 50 to 30 miles across, being left in place of the sea; but in many places the shore is high and rocky, and several rocky barriers lie off it. The only port at present frequented on the coast is that of Yalapa, at the mouth of the Rio Miche- tuco. There are a few small harbours on the coast of eastern Guatemala, but the harbour is little better than a roadstead, affording no protection for shipping. Ocos, further north, formed by the Barra de Orocos, is also an available port, but, owing to the absence of inhabitants, is not resorted to. The low tracts along the coast are very thinly peopled. On the northern coast Saino Tomas, in Honduras Bay, is a good and well-sheltered port; and somewhat inland, in the lake known as Golfo Dulce, is the port of Yabal, in some respects the principal port of Central America. Port of Ocos was designed for that market being brought to it by vessels, and thence transported to the interior by mules: owing to a bar at the mouth of the Rio Dulce, Yabal is inaccessible to vessels drawing over 7 feet of water.

The table-land of Guatemala occupies all the countries between the isthmus of Chiapasimn and that of Tehuantepec in Mexico; the island in the interior of the peninsula of Yucatan, usually called the table-land of Yucatan, forms its most elevated projection. Near its southern borders, about the town of Guatemala, its highest point is 2200 feet above the sea, and this may be considered as the mean height of that portion which is south of the Rio Motagua. But north of this river the country rises higher. The most elevated part of it appears to be that between 15° and 16° 30' N. lat. From this point it begins to lower gradually, and its north-western edges, which belong to the Mexican state of Chiapa, are incised by deep and sometimes wide valleys. No continuous range of any considerable elevation traverses this plain, the surface of which is slightly undulating, like the central parts of England; but here and there it is traversed by a range of hills, rising a few hundred feet above the plain. The descent from this plain to the low shores of the Pacific is extremely steep, and consists when seen from that side, it has the appearance of a mountain range, an illusion which is confounded by a few lofty volcanoes standing near the edge of this descent. The most remarkable are the active volcanoes of Atitlan, Coatepeque, and San Juan, situated S. and N.W. of the town of New Guatemala, of which the Volcano de Agua (or Water Volcano), according to Colonel Galindo, is 12,620 feet, but according to other authorities 13,076 feet high; and the Volcano de Fuego (or Fire Volcano) is 12,500 feet high, but which has not been ascended. All the volcanoes, whether active or extinct, are situated near the Pacific, and are in line with those of Salvador and Nicaragua. The eastern border of the table-land, by which it descends to the Gulf of Honduras, is cut by deep valleys, between which the high land takes the shape of ridges, which extend to a great distance, and in some places, as between the Rio Motagua and the Golfo Dulce, advances to the very shores of the sea. The country between the table-land and the Gulf of Honduras, may therefore be considered as a succession of valleys and ridges, except the part to the west and north-west of the Golfo Dulce, which is a low plain.

The state is well watered by a large number of rivers, but none of them are navigable. The Golfo Dulce, Polochic, and Motagua. The Rio Dulce, though short, is the most important river of Central America, being the channel by which the Golfo Dulce discharges its waters into the Gulf of Honduras, 15° 30' N. lat. The Golfo Dulce is about 20 miles long, and of considerable depth, except on its bar, where there are only 6 or 7 feet water.

The Rio Polochic rises near the village of Tactic, on the table-land of Guatemala, but soon descending into a wide and deep valley, the river turns to the south-west, and empties itself into the Gulf of Mexico. It is about 60 miles long, and narrow, with a few shoals, some 3 miles wide, and with a few shoals, some 5 miles wide. At its mouth the river turns to the north-east, and falls into the Gulf of Honduras about 15 miles west of Omoa. By means of this river a considerable quantity of the produce of the interior, in small canoes, is sent into the interior of Guatemala; they are transported from Guatla to the places of consumption by mules.

The Lacanata, which rises in this state and separates it for a considerable distance from Yucatan, becomes an important river after its entry into the state of Yucatan. The rivers which enter the Pacific are numerous, but have all a short course. One of the most important is the Motagua, which at its mouth forms the harbour of Yalapa, the port of the city of Guatemala.

There are four rather considerable lakes in the state. Of these, that called Golfo Dulce, noticed above, is the most important, as by means of it most of the foreign trade of the republic is carried on. The lake of Patz, situated in the most northern district of Vera Paz, on the table-land of Yucatan, is of an oval form and about 70 miles in circuit. It contains several islands, on the largest of which is a small fortress and a collection of houses forming the village of Puerto de Dote, and one of the minor islands has been the seat of the city of Guatemala, and near the western edge of the table-land. It is about 18 miles long and 9 miles broad, surrounded by lofty heights, including the volcanos of Atitlan, Coatepeque, and San Juan, and an extensive forest, and a magnificent outlet, though several small rivers fall into it. The lake of Amatitlan, 18 miles south-east from the city of Guatemala, is 9 miles long and 3 miles wide, and of great depth. It is much resorted to as a bathing-place by the inhabitants of
the city during the season from February to April; and near the lake are several hot and mineral springs. The Rio Michat is the chief supply.

Climate, Soil, Productions.—The climate of the table-land is that of a perpetual spring; the thermometer scarcely varies throughout the year. The average heat in the month of July is from 65 to 70 Fahr.; but during the north wind it sometimes descends to 50. From May to May, it sometimes though rarely descends 30 degrees within a few hours. The rainy season usually sets in in May and lasts till October; but rain seldom falls except between the hours of day and darkness. The wind is not very constant, and changes them continues for about a month. The other productions of this district are maize and wheat, sugar and coffee, most of which however is required for home consumption. The principal towns are Guatemala, the capital of the state, Amatitlan, Escuintla, and Suchitoto. The table-land of the lake of the same name, which formerly depended on the persons who annually resorted to it for bathing, is now, in consequence of the great increase in the rearing of cochinal, a rich and flourishing place, having a population including the suburbs of upwards of 5000. The greater of the former corregimientos, and contains about 4000 square miles. The surface is very much broken, and the soil, especially in the valleys, very fertile. The climate is colder than in some other parts of the state. Wheat, maize, and fruits are the chief products. Sheep are bred in large numbers. Jerga and other coarse woollens are manufactured. At least three-fourths of the inhabitants are Indians, who are mostly engaged in agriculture or weaving: twelve or fourteen of their villages are placed around the lake of Atitlán, the beauty of the centre of Sololá. From the midst of this lake, and the volcano of San Pedro. The chief towns of this department are Sololá, population 8000, Atitlan, and Masateunga, but neither of them is of any importance. The exports are confined to few articles. Of these the most important is that of cochineal, which was introduced into Guatemala as late as 1811, and did not for several years produce more than sufficient for home consumption. In 1811 about 12,000, which were imported 60,000, and in 1851 had increased to 1,489,100 lbs. The other articles of export are chiefly mahogany and other woods employed in cabinet work: vanilla, saharsapalli, and other medicinal roots and barks: spices, rice, tea, and cotton are also exported in small quantities. The principal article of domestic consumption is maize. British cotton and dry gossips, linen and silk fabrics; porcelain and fine earthenware; fancy goods, wines, &c. In 1851 the exports amounted to 984,488 dollars; the imports to 1,264,420 dollars.

Departments, towns, &c.—Guatemala is divided into seven departments (corregimientos), which, with their chief towns, are as follows:

1. Guatemala occupies the south-eastern portion of the territory, has an area of nearly 6000 square miles, and a population of about 90,000. The surface of the country is considerably diversified, the climate equable and genial, and the soil remarkably fertile. This and the following department form an immediate part of the valley of Guatemala, and extend from the lake of the same name, which formerly depended on the persons who annually resorted to it for bathing, is now, in consequence of the great increase in the rearing of cochinal, a rich and flourishing place, having a population including the suburbs of upwards of 5000. The greater of the former corregimientos, and contains about 4000 square miles. The surface is very much broken, and the soil, especially in the valleys, very fertile. The climate is colder than in some other parts of the state. Wheat, maize, and fruits are the chief products. Sheep are bred in large numbers. Jerga and other coarse woollens are manufactured. At least three-fourths of the inhabitants are Indians, who are mostly engaged in agriculture or weaving: twelve or fourteen of their villages are placed around the lake of Atitlán, the beauty of the centre of Sololá. From the midst of this lake, and the volcano of San Pedro. The chief towns of this department are Sololá, population 8000, Atitlan, and Masateunga, but neither of them is of any importance. The exports are confined to few articles. Of these the most important is that of cochineal, which was introduced into Guatemala as late as 1811, and did not for several years produce more than sufficient for home consumption. In 1811 about 12,000, which were imported 60,000, and in 1851 had increased to 1,489,100 lbs. The other articles of export are chiefly mahogany and other woods employed in cabinet work: vanilla, saharsapalli, and other medicinal roots and barks: spices, rice, tea, and cotton are also exported in small quantities. The principal article of domestic consumption is maize. British cotton and dry gossips, linen and silk fabrics; porcelain and fine earthenware; fancy goods, wines, &c. In 1851 the exports amounted to 984,488 dollars; the imports to 1,264,420 dollars.

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wooden cloth, earthenware, and wooden utensils. The other towns are Momostenango, Guateguetango, and Jacaltenango.

6. Chiquimula, occupies the north-eastern extremity of the state, bordering on the republic of Honduras; its area is nearly 6,000 square miles; its population about 80,000. The surface is considerably diversified, and in parts very fertile; their waters are stored up by the Guatemala and the Bay of Honduras are hot, moist, and unhealthy. Tobacco, cotton, rice, and sugar are raised largely, with maize, frigoles, &c. The sugar is grown chiefly for distillation or for making cane-vinegars and spirits of the drink of the Indians. Horses, mules, and cattle are reared in large numbers. The chief towns are Chiquimula, population 4,500; Aguaaguanil, 3,600; Jalapa, 3,500; Ixilpeque, 3,200; Mitl, 3,300; Quezaltepeque, 4,600; Zacapa, 3,000; and the little port town of Yoro, 2,000.

7. Vera Paz, the largest of the seven corregimientos, comprehends the projecting tract of country which forms the most northern part of the republic; the area is about 11,000 square miles; the population is estimated at 65,000, of whom nine-tenths are Indians. The country is very varied in surface and character of soil: but comparatively very little of it is subject to crops of rice, potatoes, and maize, and other precious timber-trees abound; the coffee, cacao, indigo, and poppy plants are said to be indigenous in the forests. In the northern part of Vera Paz is the lake of Peten. The most populous town is Coban, situated in a remarkably fertile valley; it is, with a population of 1,000, nearly all Indians, who are industrious and wealthy, possessing fine plantations of sugar-cane, bananas, pimentos and various kinds of fruit; the other towns are Salama, population, 4,500; Cajabon, 4,000; and Rabanal, 6,000, but none of them can be said to be very important.

Government, &c.—According to the constitution of the 19th of October, 1851, the executive is confided to a president elected by a general assembly, composed of the legislative council of the archbishop of Guatemala and the members of the supreme court of justice, and the members of the council of state having a deliberative voice. The president is elected for four years, but is eligible to be re-elected. The legislative assembly consists of 59 members. The council of state is composed of the ministers, eight councillors chosen by the legislative assembly, and of others appointed by the president. The revenue and expenditure average somewhat over 400,000 dollars. The debt amounts to 1,265,000 dollars; the army consists of 1,000 men, with a patriotic corps and a militia of 5,000 men.

The population consists of aboriginal tribes, some of whom live in a state of almost perfect independence, but the main body have obtained all the rights of free citizens of the republic, and have become a part of the population of the descendants of Europeans, and of the mixed offspring of Europeans and Indians, who are known as "ladinos." The Roman Catholic is the established religion, and there are few open dissenters. The church is presided over by the Archbishop of Guatemala.

During the Spanish occupation Central America was termed the kingdom of Guatemala, the city of Guatemala being the capital and seat of Government. During the struggle for independence it remained quiet and subject to Spain; but on the declaration of independence in 1821 it was for awhile united to the Mexican empire of Iturb. On the publication of the new constitution, July 2nd, 1828, by which the federal state of Central America was formed, Guatamala became one of the united states. This union was however after a short time dissolved, and Guatemala then became an independent republic, and has so continued to the present time.
and he saved the Frenchman by knocking down the Irishman. His prisoner guided him to a tower, where he found the prisoner and governor of the place, and some other officers, who had shot themselves up from the now victorious English soldier. He summoned them to surrender, and the door was unbarred; but Pat Lowe, who had rejoined him, called out, 'Dear Mr. Gurwood, they will murder you!' and as he stepped forward with the sword when he was about to take him, Pat Lowe seized the sword in his body; but his alarm ceased on finding himself kissed by the person who had seized him, who added that he was the governor, General Barrie, and that he yielded himself his prisoner. Gurwood conducted him to Lord Wellington, whom he found to be a most reasonable man, and who said, 'Tell them you will take him!' and, on his replying in the affirmative, handed him the governor's sword, which had just been surrendered, with the observation, 'Take it, you are the proper person to handle it.' Gurwood was thus enabled to reassert the privilege when every other officer in the English army wore a regulation sword. From this time he became a noted officer; but though he served with distinction during the rest of the Peninsular war, and at Waterloo, where he received a severe wound, the rank of colonel was the highest that he attained, and he did not become full colonel till 1841.

In 1830 he was placed on the unattached list, and shortly afterwards became private secretary to the Duke of Wellington. This appointment led to a very successful publication. In 1834 he was appointed editor of The Despatches of Field-Marshal the Duke of Wellington. K.G., during his various campaigns in India, Denmark, Portugal, Spain, the Low Countries, and France, from 1799 to 1815, compiled from official despatches in the possession of the Earl of Ellesmere and the Duke of Gurwood. The work extended, with a volume of index, to thirteen volumes; the publication of it occupied the colonel for a series of years, and its popularity was unexpected and unexampled. No collection of official documents of any length has ever found its way into so many libraries and so many hands. A second edition was called for, and an abridgement into one volume was issued to satisfy the curiosity of those who could not purchase the complete edition. This abridgement, the Duke of Wellington's private papers to have been materially raised by the publication, and most of his popularity in later life was based on the Despatches."

Colonel Gurwood urged him to give his consent to other publications bearing on his military career, but he did not always succeed. The colonel was in the habit of showing his friends a paper by the Duke on the battle of Waterloo, in answer to the observations on the subject by the Prussian general Clausewitz, and was much surprised at finding that one passage in it was incorrect. He did not dare to say so, and was about to leave the room, when he discovered that he had found in the book the word in that magazine for July 1844, without the slightest intimation from whose pen it proceeds—a fact which would indeed never be conjectured by any one perusing the article without previous information as to its authorship. The Duke had supplied the late Earl of Ellesmere some observations on the battle which are interwoven with his article on Alison's History of the War in the Quarterly Review. In return for the colonel's services the Duke appointed him Deputy-Governor of the Tower of London. He again visited Spain in company with Lord Eliot, the present Earl of St. Germans, to endeavour to mitigate the cruelties of the civil war between the Carlists and Christinos, in which neither party gave quarter; and through his influence to prevent the French from using the loyalists as spies. From the time of the publication of some portions of Napier's History of the Peninsular War in 1840, Colonel Gurwood was involved in a disagreeable controversy respecting the circumstances of the capture of the governor of Ciudad Rodrigo. An offshoot of the rank of fully, who had commanded one of the storming parties, made a statement in October 1838 to the effect that (be the major) had accepted the surrender of the governor; that a sword, afterwards found to be that of an aide-de-camp, had been presented to him, and that Gurwood was engaged with two officers who held bold of him for protection, one on each arm. Lieutenant Gurwood came up and obtained the sword of the governor; on seeing him present which on the ramparts, the major, according to his own account, "turned on his heel and left the spot." The major died in 1839, and this statement was made public in the following year in a second edition of that portion of Napier's History of Ciudad Rodrigo, the first having stated that "Mr. Gurwood was in the fight, but never engaged amongst the foremost at the lesser breach, received the governor's sword." Colonel Gurwood had been in garrison with the major in 1834 at Portsmouth, and always wore the sword; but the major had never produced any remark from that officer. A long and vociferous discussion ensued on the point, which was brought to a close by a very singular incident. Gurwood did not know the name of the French officer whom he had rescued from Pat Lowe; and when the latter was reassigned to the post, it was important to show the justice of his claims, as the Frenchman had guided the Englishman to the tower where the governor was found, and witnessed what then took place. Gurwood was turning over the publication when the colonel found a letter addressed to Lord Wellington in 1818 by a captive French officer named Bonfilh, who might, he inferred, be the person he was in search of. He made inquiries in Paris to ascertain if M. Bonfilh was still alive, found that he was, wrote to him, and received a letter dated the 1st of May 1844, in which M. Bonfilh informed him that he was indeed the officer whose life he had saved, and gave a statement of all that he remembered of the night of the storm, which he had related in some few unessential particulars from the recollections of the day. He had in all but a few words heard the colonel's statement, and was irreconcilable with that of the major. The colonel read it with feelings which he declared it impossible to describe. He visited M. Bonfilh at his residence in Paris, and introduced him in a pamphlet, of which he printed only fifty copies for private circulation, from one of which these particulars are taken. The preface is dated on the 14th June 1845, and it was his last literary effort. On the 30th of December in the same year, he died, and the army lost an officer who had contributed at the inquest to the effects of the wound he had received so many years before at Ciudad Rodrigo, he terminated his life by his own hand at Brighton, leaving a widow, a French lady, and three daughters."

GUTTA PERCH — [Leonard's 7.] GUYON, general Richard deBauaure, was born March 31, 1813, at Walcott, near Bath, Somersetshire, in which city he received his early education. His grandfather was a captain in the Dragon Guards; his father, John Guyon, of Richmond, Surrey, was a commander in the royal navy, and died in 1844. Richard Guyon was intended for the army, and at an early age held a commission in the Surrey militia. At the age of eighteen he obtained a commission in the 80th regiment, and was appointed aide-de-camp to Field-Marshal Lord Castlereagh, and after some years' service attained the rank of lieutenant, and was appointed aide-de-camp to Field-Marshal Baron Sperny, commander of the Hungarian life-guarda. In 1833 he married the daughter of the Bishop of Wells, and soon afterwards retired to the neighbourhood of Pelsa, where his wife's relations resided, and where he spent his time in country occupations and field-sports.

In September, 1845, when Jellachich, the Ban of Croatia, invaded Hungary, Guyon offered his services to the Hungarian diet, and received the appointment of Major of the Honveds, or national guards. On the 29th of September he contributed materially to the defeat of Jellachich at Bakoro. In the battle of Schwedew, near Vienna, on October 30th, Major Guyon with his raw troops achieved at Mannwörth the only successes of that disastrous day, when, his horse having been shot under him, he led his men to the charge on foot, and armed them with the muskets of the slain Austrians, in place of the swords with which many of them had fought. He was rewarded by being raised to the rank of Colonel on the field of battle. He was afterwards raised to the rank of General at Debrecin. He commanded the rear of Gergéi's army on the march from Pesht to Upper Hungary; and at Lipiazi, on this 10th of February, by a daring and skillful effort saved the baggage from the pursuing Austrians. On the 5th of February, with 10,000 Hungarians, he stormed the defiles and heights of Branyansko, defended by 25,000 Austrians; and bringing to a close the campaign, returned to a large amount, and cleared the way for the van of the army to pass, Gergéi having vainly attempted to turn the defiles by a flank movement. At the battle of Kapolna (February 20) he commanded a division of Domhmany's army. On the 21st of April he entered the fortress of Komorn with a small body of troops, though it...
Gymnarchus, a genus of Malacocephycous Apodid Fishes. The body is long and oval; the gill opening before the pectoral fins; dorsal fin running the whole length of the back, pointed; anal fin of the same length—a smallish, much small, with a single row of cutting teeth. G. Niloticus is the only species; it inhabits the Nile.

Gymnemota, a genus of plants belonging to the natural order Astereidaceae. It has a sub-urecrose 6-leaflet corolla, the throat usually crowned by five scales or teeth inserted in the recesses between the segments of the corolla. The staminate corona is wanting. The authors terminate by a membra, the pollen masses are erect, fixed by the base. The follicles are usually shrub, natives of the East Indies, the tropical parts of Australia, and Equinoctial Africa. The leaves are opposite, membranous, and flat. The umbels imperfect and cymose. In the greater number of species the stamens are partly included in the ovaries; the seeds are globose, with a gland-like body or fleshy tuft at the base of each filament. G. lactiferum, Cow-Plant, or Milk-Bearing Gymnema, has an erect stem, or rather twining; the leaves are on short petioles, ovate, bluntly acuminate, usually unequal-sided; the vessels are many-seri, slender, running the throat of the corolla crowned by five fleshy tubercles; the tube furnished with double pilose lines running from the tubercles. It is a native of Ceylon, where the milk of the plant is used as a substitute for cow's milk, and the leaves are boiled with food.

G. tingens is a native of Pegu. It has a twining globular stem, cordate leaves, acuminate to oval; the umbels or corymbs often twin, at first shorter than the petioles, and later spiral elongated; the glands of the filaments more than half shorter than the stamens; follicles cylindrical, spool-shaped; stigmas simple, oval, mucin, crowning the tube of the corolla, and therefore exceeding the stamens. The flowers are large, numerous, and of a pale-yellow color. The stamens of this plant a green dye is prepared by the Burmese. Seventeen species of this genus are enumerated, none of them of any particular interest.

Lycystis, or Smellible Kingdom; Don, Dich tromyemata Plants.

Gymnetrus, a genus of Fishes belonging to the group of Riband-Shapeed Asaheilort. It has the following characters:—Body elongated, compressed; a single dorsal fin extending the whole length of the back; ventral cleft ending each of a single ray, only sometimes, the anus dilated at the end; no anal fin; teeth pointed, small. The species of this genus have very rarely been obtained entire. They have generally been taken dead, and consequently have been crushed and mutilated. Of the species of the genus, Mr. Yarrell says, "three of these belong to the Mediterranean, two to the seas of the North of Europe, and two to India. One northern species, besides one of those apparently belonging to India, has been taken on the shores of the Baltic, and is a native of the coast of Poland, once in Scotland; that of India, once on the coast of Cornwall." G. Haukentu (Bich), Hawken's Gymnetrus, the Oest Gymnetrus, the Cell Conin of Cornwall. This species has been taken in Cornwall. The following description has been drawn up by Mr. Conch from a drawing and notes of a specimen taken in a net at Mont's Bay in 1791—"The length without the extremity of the tail, which was w. 36 feet; the depth, 10.9 inches; thickness, .9 inches; width, 9 inches; width, 9 inches; with an enduring jaw, long and slender; eye large; pectoral fin round; no anal fin; the dorsal fin reaches from above the eye to the tail. The restrictions are formed of four long radial processes, proceeding from the thorax, and ending in a fan-shaped appendage, of the back and bellies dusky-green; the sides whitish; the whole varied with dark and spouts of a darker green; the fins crimson."
specimen of this fish caught off the coast of Northumberland, was exhibited in London at the time the discovery of the Great Sea-Serpent was announced, and was supposed to explain the nature of this discovery.

The Gymnura auricula of Cuvier, the Vasaen, or Deal-Fish, has been referred to the genus Trachypeters. [Trachy-

The Gyridinidae, a family of Coleoperae insects belonging to the section Pentamerae, and the sub-section Hydrophages or Water-Beetles, and distinguished by the minute size of the antennae, which are minute on the head, and shorter than the head, the second joint being dilated into a kind of ear externally; the two fore legs are long and advanced in front like arms, but the four posterior legs are very short and compressed, but broad, and is four in number, two being placed above and one below: the palpi are very small; the thorax short and transverse; and the elytra oval, depressed, and oblique at the extremity, leaving the tip of the abdomen exposed. This family corresponds with the genus Gymnura of Linnaeus, and unlike the Dytiscidae to which they are nearly allied, these insects are distinguished by the metallic brilliancy of their covering; living for the most part on the surface of the water, they receive the impressions of the light in a more direct manner than the Dytiscidae, and are accordingly ornamented with tints of a brassy or bronzed metallic hue, which glitters in the sun in the greatest degree. The velocity with which they execute their evolutions upon the surface of the water is really surprising, and has obtained for them the name of Torquietaux by the French, and Wirglises and Waterflies by the English. Sometimes indeed they remain stationary for a time, so that it seems easy to secure them, but on the least motion they are instantly alert, escaping with surprising agility and diving to the bottom of the water. The situation of their eyes adds greatly to their defence, enabling them to see objects both above and below them. In the 'Journal of a Naturalist' we find the following account of their proceedings. "When water quiet, still water affords a place of action to a very amusing little fellow (Gymnura natator), which about the month of April, if the weather be tolerably mild, we see gambling upon the surface of the sheltered pool; and every school-boy who has angling for minnows in the brook is well acquainted with this merry little swimmer in his shinning black jacket. Retiring in the autumn, and resuming all the winter in the mud at the bottom of the pond, it awakens in the spring, rises to the surface, and commences its summer sports. They associate in small parties of ten or a dozen near the bank, where some little projection forms a bay or renders the water perfectly tranquil; and here they will circle round each other without contention, each in his sphere, and with no apparent object from morning until night with great spiritliness and animation, and so lightly do they move that they can glide round for a minute, it seems, without circles on its surface. Very fond of society; we seldom see them alone, or if parted by accident they soon rejoin their happy companions. One pool commonly affords space for a large antemias, yet they do not always consist of the family, but perform their circling motions in families or associations. If we interfere with their merriment they seem greatly alarmed, disperse or dive to the bottom, where their fears shortly subsist, as we soon again see our merry little friends gamboling as before. When they dive to the bottom of the water in the manner above described, they carry with them a little bubble of air affixed to the extremity of their bodies. Also they are sometimes to be found flying, their well-formed wings permitting such an operation, while the high polish of the body protects them from the action of the water. With the exception of a few exotic species, the insects of this family are of a small size, seldom exceeding a quarter of an inch in length; and the largest ones do not reach one inch. Some of the species are found on the margins of the ocean. They emit when touched a disagreeable scent, arising from a milky fluid which exudes from the different parts of the body, and which is not readily dispelled. The structure of the fore legs indicates their mode of life, serving as arms to convey the food, which they find floating upon the surface of the water, and which consists of small dead insects, &c., to the mouth. The number of species of this family does not exceed 60 or 60, and of these not more than eight or nine are found in this country; of these the Gymnura natator is the common one. It is of a brilliant bronze colour, with the sides of the body and antennae metallic; the margins of the elytra and legs reddish. The elytra are ornamented with lines of impressed spots. It is about a quarter of an inch in length.

the establishment of Sunday Schools, and other Christian efforts. In December 1797, the Society for propagating the Gospel at Home was instituted. In February 1799, Mr. James Haldane became the first pastor of the Tabernacle or Circus Church. In May 1801 the congregation removed to a new Tabernacle, built at the head of Leith Walk. The entire cost of Mr. Robert Haldane. In 1808 Mr. James Haldane having changed his views with respect to Infant Baptism, although he left the communion open to parties who might differ in their views of this question, many of the members of his church left. Mr. Haldane continued minister here till his death, which took place on the 8th of February 1851. Mr. Haldane published numerous pamphlets on subjects which at the time excited attention in the religious world, and his larger treatises may be found in his works on 'The Doctrine of the Atone-ment;' 'On Christian Union;' his 'Exposition of the Epistle to the Galatians;' and 'Views of Social Worship.' Some of his pamphlets were directed against the opinions of the Irvingites.

HALES OWEN, Worcestershire, a market-town and borough, in the parish of Hales Owen, is situate in 53° 32' N. lat., 2° 5' W. long., distant 36 miles S.E. by E. from the river Severn, and 26 miles N.W. by N. of Chester. The population of the borough of Hales Owen in 1851 was 3412. The living is a vicarage in the archdeaconry and diocese of Worcester.

The town of Hales Owen is pleasantly situated in a valley, and contains many good houses. The parish church is a fine building, with a handsome spire, supported by four arches. The Independents, Baptists, and Wesleyan Methodists have chapels. In Hales Owen are a Free School,
founded about 1852, which has an income of over 100L. a
year, and had 60 scholars in 1853; National Schools, and
an Infant School. Nails and hardware are extensively
made. The market-day is Monday; fairs are held on
Easter Monday and Whit-Monday. Some remains exist of
an abbey of Selmeston, and a church of Selmeston, both
in the reversion of the Kilmington. Near Hales Owen is
the Leasowes, the birthplace, the residence and
place of residence of the poet Shenstone, and the grounds
of which were arranged by him. Shenstone was, in
Hales Owen churchyard, and the church contains a monu-
ment.

Halesworth. [Suffolk.] Halibut, or holibut. [Hippolousus.]

Haloclasia (Fries), a genus of Plants belonging to the
natural order Umbellifera, and the tribe Sacesene. It has
a compound leaf, with a petiole, a leaflet, and an
infixed lobe and short claw; the fruit elliptical, terete,
or slightly dorsally compressed; carpels with five sharp
somewhat winged ridges; interstices and commissure with
many villosity, not cohering to the seed, without vittae.

One species of this genus is a native of Great Britain.

H. Scoticum, Scottish Losey, is found on rocks on the
coast of Scotland and Northumberland. It has an her-
beacon stem, tinged with red, from 18 to 16 inches
high. H. Fasciculat. Haltwhistle. [Northumberland.]

Hamilton. [Canada, &c.] Hamilton, Sir William, as head of the old family
of the Hamiltons of Preston, in Haddingtonshire, inherited a
title of Lord Preston, in 1763, but for some time remained
without issue. He was born on the 8th of March, 1778, in Glasgow, where his
father, Dr. Hamilton, was a professor in the university; and
there he received the earlier part of his academical education.
The Snell foundation of exhibitions at Balliol College, has
long been a prize for the more distinguished among the
Glasgow students: Adam Smith, among others, owed his English education to it. As a Snell exhibitioner Hamilton
went to Oxford; and he took his degree with honours as a first-class man, in 1801, or 1802. 
In 1813 he was admitted a member of the Scottish bar.
But law, except the Roman, did not receive much of his
attention; and the only practice he ever had was the very
little which became incumbent on him, when, after a time,
he was appointed aウンior solicitor of solicitors. Even
while a very young man, he had acquired no small part of
his singular and varied stock of knowledge; and mental
philosophy began early to be his favourite pursuit. On
the death of Thomas Brown, in 1820 he stood for the professor-
ship of Moral Philosophy in the University of Edinburgh:
but Mr. Wilson was the successful candidate. Next year,
on the nomination of the bar, he became Professor of
University History in the same university. This appointment,
little more than a year in the enjoyment of; in respect of the
independence, was hardly better to the performance of duty. The depart-
ment is not in any way imperative on students: and it never
commanded pupils, unless for a while under the elder Tytler.
Sir William Hamilton, however, was appointed to it,
chiefly from a sense of his inability to do justice to the
professional drudgery, was left undisturbed and undisturbed,
to the prosecution of his studies and speculations. It was long
before these bore fruits visible to any but his immediate
friends. For the digesting of his thoughts he was nearly as
independent of the necessity of writing, as his iron memory
made him to be for the preservation of his knowledge; and
he seems to have long shrunk from the toil of endeavoring
to expand ideas, for which he did not hope to find an
easy or popular audience. It was only, as he himself
decided to the reading of the editor of the Edinburgh Review,
that he was induced, in 1839, to give to
that periodical the first of a series of contributions, which
closed in 1839, and which unfortunately constitutes as yet
by far the larger proportion of all his published writings.
Those papers exhibit the variety of his learning not less than
its depth; and the philosophical essays which were among
them speedily found readers, who, if few, were competent
to do justice to their excellence.

In 1836 he found his right place: he was appointed by
the town council of Edinburgh, though not without a con-
test, to be Professor of Logic and Metaphysics in the Uni-
versity. He was, what very few of the Scottish professors
have been, an object of admiration, and a model of both
the spheres indicated by the official title. The vague term
which stands second, opened up to him in his teaching any
walk he might choose to tread in the vast field of mental
philosophy, of which he had probably in his studies traversed
more than any other man then or now alive. The first title
pointed his way to one special mental science, which he had
studied in all its existing shapes, and which he now set about
systematizing in harmony with new lights that had dawned
on his own science. The teaching of the mental and official
practice, of combining the whole matter of his instruction
into one course of lectures, to be delivered in one and
the same session (a term of six months in each year), he lectured
alternately in the one named section and in the other— in
London, but for a large part of the year, in Edinburgh.

His reputation and influence now extended rapidly. Lecturers and philosophers
put their heads together, and circles of Germany, and had been to know and esti-
ated by many at home: the most eminent foreign thinkers
had concurred with not a few of our own, in pressing sar-
very soon, likewise, after that year, his health began
to fail; and paralysis struck the right side of his body from head
to foot. He was for a time utterly disabled from teaching, and
was afterwards able to lecture only with frequent assistance.
But the vigour, both of intellect and of will, was un-
paired as it had been with Dugald Stewart under a similar
calamity. His reading and thinking were still carried on;
even his writing was so, not without very much aid from
others. That more of his large designs were not executed,
was not because they were not sufficiently supported, but
because they were too ambitious, and too tedious, and too
on the one hand, and on the other to newer ones, especially
Hamilton's own metaphysical doctrines—doctrines which he
himself always regarded, and firmly and thankfully re-
spected, as having their essential germ and foundation in Reid,
and as being merely a development of the common sense
philosophy to results made possible by a combination of
scholastic and German methods. Sir William Hamilton's
annotated edition of 'The Works of Dr. Thomas Reid'
appeared in 1846, much of it having been begun a few
years before. But for the sake of the existing works for this date (1852)
leaves it lamentably incomplete. On not a few problems
deep interest—on not a few also bearing closely on our
comprehension of Hamilton's own system of thought, we
are left with references and foot-notes to 'the numerous dis-
ventions, of which not a word is yet given us; and a dissertation
asserting his own peculiar theory of the Association of ideas
is broken off abruptly at the end of the volume. In 1852
appeared the first edition of a reprint, with notes, of
'his Metaphysical Discourses—Discourses on Philosophy and
Literature, Education and University Reform—chiefly
from the Edinburgh Review.' Translations of several of the
essays had previously been made into French, Italian,
and German, and are well worth a place among the
particularly valuable. Sir William's regard for the Scottish school
in philosophy next showed itself, not (unluckily) in the completion of his 'Reid,' and those farther developments of

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his own doctrines which he had there promised, but in a
tribute to the memory to another of its celebrated masters, from
whom he had neither derived, nor professed to derive, much
if anything in his own opinions. He undertook to
cite, with notes, the collected works of Dugald Stewart.
The publication, begun in 1804, is still uncompleted; and
nothing has been added to it, which he considered
formerly it. In 1805, when in country-quarters, Sir William
suffered fracture of a limb; and he died in Edinburgh on
the 6th of May, 1856. He has left a widow and family.

The romantic rationalism of the day required it, as
nothing else to be in such a state, that they may easily be prepared
for the press.

As those who knew Sir William Hamilton through his writings only, cannot do full justice to the multifariousness of
the aspects of his genius, and the ripeness of his mind, a few
lines which his writings which had personal bearings, will do positive injustice to the real likableness of his personal character.

He was undoubtedly a stern, and keen, and often eager controver-
sialist, occasionally even a hasty one; in debate he never beat about for smooth words; and, absorbed in his
love for science and learning, he sometimes forgot to be
gentle towards those whom he thought to be erring or knew
to be comparatively ignorant. He was watchfully jealous also, of what he considered an inadequate preparation of
his elders in the art of writing. Under the influence of the
combative tendency, moreover, there lay great generosity,
great kindliness and warmth of heart: he was invariably
amiable when occasion did not force on polemics: he was an
active and steady friend, beloved as well as esteemed by
those who were associated with him by literary ties. About
his erudition there cannot well be two opinions among
those who have had opportunities and competency for judging. Its mere mass was a thing extraordinary: it was a
manifest demonstration of accurate scholarship; it spread over tracts of reading
the most obscure and neglected; and it was, everywhere, the
real knowledge of a thinking man, not the word-cramming
of a pedant. His range embraced all the great divisions of
knowledge, except mathematics and physical science; while
here, too, it did not exclude anatomy, with physiology and
some other branches of medicine. He was a thorough
linguist in the classical tongues, and in German. With
as little as possible of the poetical temperament, he was well
versed in the ingenious theories of his German colleagues, unusually
extensive. In philosophy he was familiar with the
Greek writers one and all: Aristotle and his commentaries he probably studied more extensively and profoundly than
any modern reader; and he was the only man in the
whole age who knew the whole course of the scholastic philosophy, as
no man else has ever known it since the middle ages departed.

With British systems it is needless to say that he was
familiar in all directions; and he was the only man among
the circle near to having studied—and nowhere either
carelessly or at second-hand—all the German systems that
have emerged or diverged from that of Kant.

As to his originality, this question may be put: not whether
Hamilton was the most original of philosophers; but whether
there has ever been any philosopher who, to learning even
half as great as his, united so much of real and active
originality as a thinker. In his treatment of details he has
a favourite manner, which often disguises his independence. His
reasoning and mode of argumentation, as if the best way of
discerning philosophical truths was by decyphering them in
some medieval text through the dust of centuries. He takes a pride in quietly fathering on some
scholman or other a doctrine or an argument which many
may have been too glad to take for themselves.

The outlines, however, of those sections in his own
philosophical creed which he has taken the trouble to
expose, are laid down broadly enough to let their character
be seen clearly. Be his leading doctrines held true or false,
with no respectability attached to them, he was the
ministry for the production of a philosophical
originality, and in his own as very many systems which all of us rightly admit to
be essentially novel,—as much his own, it may be said, as
any system of philosophical opinions can be, unless it ignores
everything that great thinkers have ever thought before.

What may be the correctness, and what the value, of his
peculiar opinions, is a question on which, if it were to be
adjudged at present, contradictory verdicts would be given.

Probably no one will be competent to decide it justly, till
there has been some considerable time for the test of the
facts, which will at last be given to the world. Not
merely the probability, but something like the certitude,
which travel in a track, not only at several points
new in itself, but likewise, everywhere, little familiar to
most thinkers in this century. Hamilton's writers are Ger-
man; his mind is that of a German mind. He is
indeed, with which he has taken German doctrines and methods
(with a large admixture of Scholasticism) as materials to
be distilled in his own alembic. The exotic character is observable,
both in his highly speculative aims, and in his severe
exhaustion of the sources of philosophy. German
characteristics is distinctively alien to the broadly practical English
mind; and the latter is one which has never, before him at
least, been made to take root in the philosophic mind of
Scotland. Nor can his writings be mastered without pains.
He never cares for doing more than saying what he thinks to
be worth saying—saying it unequivocally, and saying it in
the smallest number of words that is consistent with safety.
He will not turn aside to amuse us; he will not hurry or
wavering as a hard master to his exercise. He is a
precise, dry, writer. But for such as will take the trouble

Of Hamilton's Psychological and Metaphysical doctrines, nothing special requires to be said.
They are before us, in certain parts, in his own exposition; and that they have already
been much discussed, and have come under various exacting
powerful influence on speculation, is a good omen for
philosophy. We have, especially, his treatment of three great
problems in philosophy. First, there is his theory of the
unlimited: two kinds of knowledge, complete and
ephemeral. Secondly, there is a special application of this theory to
the construction of a theory of External Perception. Thirdly,
there is an exhaustive system of Metaphysics Proper, or
Ontology, in his 'Philosophy of the Conditioned,' or 'Conditions of
the Thinkable'—a vast and noble idea, traced out for us,
as yet, in nothing but a tantalising fragment.

Regarding his Logical system, our public information is
still very unsatisfactory. It is to be gathered from an appendix
to his 'Discussions,' and an authorised but unguaranteed
publication from lectures, Bayes's 'New Analytica.' The materials
will probably convey no distinct notion of the system,

Instead of recognising only four forms of propositions, the A, E, I, O, of the old
logicians, he insists on
admitting all the eight forms which are possible.
(See Thomson and Salley.)

He widens the range of the syllogism, by admitting all moods which can validly be constructed
by any combination of any of his eight kinds of propositions.

4. The Port-Royal doctrine, of the inverse ratio of the
expansion and contraction of time, is elaborated
in its reference to the syllogism. This application of the
doctrine has certainly not been anticipated by any logician.

Hämmer-Pürostall, Joseph, Baron Von, was
born in 1774 at Grätz in Styria, where his father held a
respectable post under the Austrian government. He was
educated at the University of Vienna and received his
degree in 1796 from the University of Oxford, an academy established by Prince Kaunitz.

After having taken a
part in the compilation of Meminsk's Arabic, Persian,
and Turkish Lexicon, he was appointed in 1796 secretary to the
Baron von Jesiisch, the reporter to the Oriental section in the

1849, he translated a Turkish poem on the Last Judgment, and
supplied several other poems to Wieland's 'Deutscher Mercur.' In
1798 he was attached to the embassy of the learned Baron von Herbst at Constantinople, who sent him with one of the imperial consuls on an important errand to Egypt, where he procured for the imperial library some mummies of the ibis, hieroglyphic lamps, a number of mummies, and other rarities. As interpreter and secretary he made the campaign in Egypt under Hutchinson, Sir Sidney Smith, and Joseph Facha, against Menou, and in the autumn of 1801 proceeded by Malta and Gibraltar to England. He arrived at Harburg on the 20th of November 1801 accompanied, in August, the Austrian ambassador, the Baron von Stürmer, as secretary of legation to Constantinople. In 1806 he was appointed consular-agent in Moldavia. In 1807 he returned to Vienna; in 1812 he was a state councillor, and in 1817 a minister of foreign affairs. In 1818 he succeeded to the estate of the Countess von Purgstall. In 1815 he had occupied himself earnestly in procuring the restoration of the Oriental manuscripts and other treasures, which had been removed from the Vienna library to Paris by Denon, during the occupation of Vienna by the French in 1809. In 1847, continuing to be in the active service of the department of foreign affairs as councillor extraordinary, he was chosen president of the newly instituted academy, which he resigned after holding the office for two years. His intervals of leisure from business were spent at his castle of Hainfeld in Styria, where he laboured on his very numerous literary and historical works, on which he died on the 11th of August, 1855. His works are extremely numerous, and those of a historical character highly valuable. His publications of Turkish, Arabian, and Persian poems are in many instances interesting to the general reader, but his philological knowledge was not sufficient to make him a reliable translator to the student. Among the more noticeable of his historical works are: 'The Trumpet of the Holy War,' 1806; 'The Constitution and Government of the Ottoman State,' 1816; 'Dances upon a Journey in 1804, from Constantinople to Broussa and Olympus, and thence back byNicma and Nicomedia,' 1818; 'History of the Assassins, from Eastern Sources,' 1818, a work which has been translated into English by Mr. Wood; 'Constantinople and the Bosphorus, topographically depicted by drawings, arab., pers., turk., bibliotheca cases,' 1822; 'History of the Ottoman Empire,' in ten volumes, 1837-1834, an excellent work, of which several editions have been published; 'The Government under the Khilifa,' 1835; 'Picture Gallery of the great Musulman Commanders, with Memoirs,' in six volumes, 1837-39; 'History of the Golden Horde of Kiptchak, that is, of the Mongols in Russia,' 1840; 'History of the Ilkhan, that is, of the Mongols in Persia,' 1842-44. All these works give a definition of the political state and present state of the East. Of his other productions we may mention, 'Schrin,' a Persian poem, 1806; his translation of the 'Divan,' of Hafi, from the Persian, 1813; his 'History of the Literature of Persia, with Specimens from 700 Poets,' from Persian, Turco-Mongol, Slav, Arabian, and Turkish sources, 1818; 'The String of Jewels,' from Abul-Maazia, 1823; a translation of the Arabic lyrical poet Motzemebi, 1823; a translation from the lyrical poems of Baki, 1835; a 'History of Turkish Poetry,' with selections from 2000 poetical works; Faist's allegorical Turkish Epic of the Rose and Nightingale, 1834; Samsachari's Arabic poem of the Golden Necklace, 1835; Mahmud Scheibistere's didactic poem on Sulfism, entitled the 'Rose-Bloom of Secrets,' 1836; the 'Turkey and Turkish didactic and historical works; 1840; and a 'History of Arabian Literature,' in three vols. 1850-52. He has also written a volume 'Mungan's Drink-pong,' (Mungan's Triad), containing an Indian pastoral, a Persian song, and a Hindu comedy. For his translations of the 'Contemplations of Marcus Aurelius' into Persian, published in 1831, he was rewarded by the Shah with the order of the Sun and Lion. In 1810 he established a periodical work 'Miners of the Orient,' to which he contributed many essays on ancient and modern Arabia, and a 'History of Persia,' which was continued till 1816; and he was a frequent contributor to the 'Jahrhüben für Literatur' ('Year-Books for Literature'), and to other periodical works, H.A.B. [Von Vorwacht] and H.A.B. [Von Vorwacht].

HAB. [Habran, S. J.]

HABURG, a sea-port town is the kingdom of Hanover, province of Lüneburg, is situated on the left bank of the southern arm of the Elbe, opposite Hamburg, 106 miles by railway N. from the city of Hanover, and has about 9000 inhabitants. It is surrounded by walls, and defended by a citadel, which also commands the passage of the Elbe. There are two churches, an hospital, a gunpowder factory, sugar refineries, tanneries, manufactories of woolen stuffs, lines, and mercantile houses. It was of ancient foundation, and was possessed by the Danish, and afterwards by the Electors of Saxony, and is situated between the countries south of the Elbe. The timber trade of Hamburg also is extensive. A steam-ferry affords frequent and rapid communication with Hamburg. As sea-going vessels could not formerly be brought alongside the quays, goods were landed by means of small boats called 'scheffen,' from a port near Hamburg, and enlarged so as to afford accommodation for 500 vessels, which may now land their cargoes on the wharfs. The depth of the channel between Harburg and Altona is 10 feet at low and 15 feet at high water. The port extends to the railway goods-station, and mercantile vessels. Altona is a large and busy port, and consists of 500 acres of land, and the hold of vessels and placed on the train. The improvement of the harbour, the completion of the railway, and the declaration of the freedom of the harbour in 1850, gave a great impetus to the commerce of Hamburg, which still continues to improve, although the freedom of the port was suppressed in 1853 by the commercial treaty with Austria and Prussia. The distance to Hamburg across the Elbe is four miles and a half.

HARDINGE, HENRY, VICOUNT, third son of the late Lord H. (born 1801), was educated at Harrow, and at the University of Durham, by Frances, daughter of James Best, Esq., of Chatham, was born at Wrotham, Kent, on the 30th of March, 1785. He was a member of a family which has long been seated at King's Newton Hall, Derbyshire, and is said to have been of the old Saxon shire of Deorulf." Having spent a short time at Eton, Henry Hardinge was gazetted ensign in a regiment of foot, October 8, 1798, obtained his lieutenancy in 1802, and captaincy in 1804. It was his good fortune to be posted to the 95th, which won the battle of Waterford, then Sir Arthur Wellesley, under whom he served throughout the whole of the Peninsular War, and for a considerable time was upon the staff of the commander-in-chief; he was also for nearly the entire period deputy-chief of staff, and was at the battle of Novi. He was present at the battles of Roli and Vimiera, where he was severely wounded; at the battle of Corunna he was by the side of the gallant Sir John Moore when he received his fatal wound. After having lost his friend at Corunna, he was present at the passage of the line of the battle of Buiscos, the lines of Torr Vedras, and the battle of Albuera. In this engagement he displayed the greatest skill, courage, and self-command; it was a hard-fought field, and to the change in the ground was largely due the final defeat of the army. The value of the British infantry, Lord Hardinge often pointed back in after life as having encouraged him as a general to persevere through every obstacle, and to place perfect confidence in the enduring valour of British troops. After the battle of Vitoria in 1813 he was one of the commanders of every engagement of the war. He took part in the first and second sieges of Badajos, at Salamanca, and at Vitoria, where he was again severely wounded, and also at Pampeiana, at the battles of Las Poyenes, and at Nivelle, Nive, and Orthes. When he returned to England after the close of the Peninsular War, he was justly regarded as one of the most gallant officers in the service. Upon the renewal of hostilities he was again in arms, and took an active part in the operations preceding the battle of the Pyrenees on October 9, 1813, whose staff he then was serving. Two days before the battle of Waterloo he was employed as a brigadier-general with the Prussian army at Ligny, where, in a skirmish with the enemy, he was wounded in the left arm, which had to be amputated immediately, and prevented him from taking a personal part in that glorious victory. He was however rewarded with the dignity of K.C.B. on the enlargement of the order of the Bath in the same year, and with a pension of 2000 a year. He died at his palace of Wesselton, near the coast of Russia.

When upon the resignation of Lord Goderich, in 1829, the Duke of Wellington undertook the construction of a ministry, he chose Sir Henry Hardinge (who had been returned as member for Durham in 1820 and again in 1826), to succeed Lord Grey. He was subsequently made a privy counsellor, and a member of the privy council, and two years later exchanged this position for that of the chief secretarieship for Ireland, under the late Duke of Northumberland as lord lieutenant. Here however he did not remain long; the Duke's ministry
retired from office in the autumn of the same year, and Sir Henry Hardinge returned to England. He resumed his high post however under the short-lived ministry of the late Sir Robert Peel, which lasted from November 1834 to April 1835. From this time till the return of Sir Robert Peel to power in September 1841, Sir Henry Hardinge remained in office. At the commencement of the Crimean war, the directors of the East India Company thought that the time had come when it was necessary for them to recall Lord Ellenborough from the high post of governor-general of India. It was stated by Sir Robert Peel in his place in the House of Commons, that when the Russian invasion of the Crimea, and the Home Government were at issue as to the propriety of this step, they were quite of one mind as to the selection of his successor; and that when the premier recommended Sir Henry for the vacant post, on the ground of his great experiences of civil matters, his high personal character, and his military eminence, the chairman of the company answered that his own choice had already fixed upon the same individual.

In 1844 he accordingly undertook the government of India, and was sworn into office on landing at Calcutta in the July following. On his arrival he found the vast territories under British rule enjoying the most profound peace. The disasters of the Afghan campaign had been averted; Sir Harry Outram had been killed at the battle of Scinde at Measoe and Hyderabad; Scinde itself had been annexed to our dominions; and the Mahrrata war had been terminated by the submission of the Durbar at Gwalior. The governor-general had therefore ample time to make himself master of very many details of government, in which he was not slow to perceive that considerable reforms were needed. Able and indefatigable in his efforts, he did his best to bring about a better feeling and a more friendly footing than had hitherto existed between the rulers of the Company and the claims of the natives to many privileges; he promoted a stricter discipline among the troops in general; he lent his powerful aid to the organisation of those Indian railways which have since been carried out with such marked success under his successor Lord Dalhousie; and in short, he did all that was in his power to promote the welfare of the community at large.

But the course of Indian events was not long destined to flow on in peace. A storm of war and bloodshed was gathering, and Sir Henry Hardinge, with all his powers, could not have foreseen or avoided the events which awaited him. The death of Ranjeet Singh, the Lion of Lahore, had paved the way for an infinity of plantings and combinations, both of the British and the native dominion. Since the death of the Lion, it seemed that the controlling power had left Lahore; the young maharaja, Dhunleep Singh, a child of four years old, was, together with his mother, in the hands of the Sikh soldiery, who were weary of domestic faction, and clamoured to be led against their English neighbours. Active preparations were made by the Sikhs for crossing the Sutlej; but long before the public had any idea of what was going on, Sir Henry Hardinge was on the alert, and had quietly concentrated a body of 32,000 men and guns round Feroepore, Looodianah, and Umballa. The governor-general reached the latter place about the middle of December, and, proceeding to Looodianah, inspected the various cantonments, and made himself acquainted with the system of defence. He then went up the whole of his force from Umballa; and on the 13th, learning that a large Sikh force had crossed the Sutlej river, he issued a proclamation against the hostile invasion. On the 17th the Sikhs advanced, and partly entrapped themselves within strong earthworks at Feroepore, while the other part encamped near Moodkee, opposite Feroepore. The combined operations of the British cavalry under Brigadiers Gough, White, and Mactier, and the infantry under Sir Henry Hardinge and his brother, who was acting as colonel of the 1st annum, and General Lilley, drove back the Sikhs from their well-contested position, and won the glorious victory of Moodkee—a victory too dearly purchased by the death of Sir Robert Sale. On the 22nd the attack was renewed at Feroepore; but no results were obtained, and on the 26th the Sikhs in some Sikh guns were being brought to bear with deadly aim upon the British columns, when the governor-general mounted his horse, and at the head of the 80th regiment, and a portion of the 9th European, carried the guns at a charge, and spiked them. The main force of the Sikhs, which had been carried by the bayonet, the enemy’s guns were captured, and the invaders recrossed the Sutlej. The want of cavalry alone prevented Sir Hugh Gough from following the enemy and completely destroying him.

There is something truly touching in the fact that, in this important battle, Sir Henry Hardinge, though he held the supreme civil authority in India, offered his services to Sir Harry Outram to take an active part in the eventful scenes of this and the following day, in the pursuit of the left wing of the army throughout. The Sikhs, again defeated at Sobors and Ailival, were forced to sue for terms; and the treaty of Lahore, concluded by Sir Henry Hardinge, the 15th of April, 1846, went so far as to give a nameless conqueror. He exacted from the Sikhs the whole expense of the war, and left a British Garrison, under the late Sir John Littler, in Lahore, the capital of the Panjab, for the protection of the maharaja’s authority. This country—a healthy, well watered, and fertile region—was consequently annexed to our dominions by the Marquis of Dalhousie. On the ratification of this treaty, Sir Henry Hardinge received the thanks of both Houses of Parliament, and the title of lord was conferred upon him. He was advanced to the peerage as Viscount Hardinge of Lahore. The East India Company also conferred on him a further pension of 5000 l. a year; and the city of London voted him their freedom. In January 1846 he was succeeded in the Indian government by Lord Dalhousie, and the Sikhs, by the principle of Tory principles, after his elevation to the peerage Lord Hardinge rarely spoke or biased himself in the House of Lords on any measures except those of military interest.

On Lord Derby’s advent to power in February, 1846, Lord Hardinge again to England as master-general of the ordinance, and succeeded to the post of commander-in-chief, on the death of the Duke of Wellington, in the September following. He obtained the colonelcy of the 71st Foot in 1846, and was promoted to the dignity of G.C.B. in 1848 on foreign orders, he received those of the Red Eagle of Prussia, Wilhelm of the Netherlands, the Tower and Sword of Portugal, and that of San Fernando of Spain. He also received a cross and five clasps for his Peninsula services, and was present in no less than sixteen general actions for which medals were granted. He was promoted to the rank of Field-Marshall on the 2d of October, 1855. He resigned the office of commander-in-chief in consequence of a paralytic seizure, in July 1856. In the administration of the Home Guards, and veteran discipline of the Duke of Wellington, Lord Hardinge trode most carefully and religiously in his Grace’s steps. In 1851 he married the Lady Emily Jane Stewart, daughter of Robert, first marquis of Londonderry, and widow of the late Admiral Sir Henry Hardinge, and daughter and two sons. The younger son, Arthur, now captain and lieutenant in the Coldstream Guards, was aide-de-camp to his father in the battles on the Sutlej, and was also present at Alma. His lordship died September 24, 1856, and was succeeded by his eldest son, Charles Stewart, born in 1828, who had been private secretary to his father while governor-general of India.

HARE, JULIUS CHARLES, a distinguished English divine and controversialist, was born in 1796, and was one of the sons of the Rev. Robert Hare, rector of Hurstmonceux and vicar of Nissenfield in Sussex, who was the son of Dr. Francis Hare, bishop of Chichester. He was educated at Trinity College, Cambridge, and graduated B.A. 1816, and M.A. 1819. In 1822 he was instituted to the rectory of Hurstmonceux (a living belonging to his family); in 1840 he was appointed Archdeacon of Lewes; in 1861 he became one of the prebendaries of Chichester Cathedral, and from this year to his death, which took place in 1879, he was the great-grandson of the last of the family of Majesties’s chaplains. He died at Hurstmonceux on the 33rd of January, 1855. Such are the principal external facts in the life of a man whose personal influence in his day was so great, and whose works so important in our literature. His first literary appearance of any note was in 1837 when, in conjunction with a younger brother (the Rev. Angus William Hare, M.A., of New College, Oxford, and rector of Allton Barnes, Wilts, who died in 1834), he published a series of anonymous pamphlets entitled 'Questions at Truth, by Two Brothers.' Subsequent and enlarged editions of this work have been pub-
lished; and also a 'Second Series' under the same title). In 1828, in conjunction with the Rev. C. Thrilwall, afterward Sir, Mr. H. appeared as translator of the first two volumes of 'Niebuhr's History of Rome,' from the German. Of his subsequent publications, the following are the most important:—The Children of Light: a Sermon, 1838; 'A Vindication of Niebuhr's History of Rome,' in the 'Literary World,' 1839; 'Sermons preached before the University of Cambridge,' 1839; 'The Victory of Faith, and other Sermons,' 1840; 'The Better Prospects of the Church: a Charge to the Clergy of the Diocese of Sodor and Man,' 1843; 'The Church: a Sermon,' 1845; 'The Mission of the Comforter, and other Sermons,' 2 vols., 1846; 'The Meas...
city on the 7th of July at the head of a column of about 1900 Europeans and Sikhs to retake Cawnpore. The garrison had been treacherously massacred after surrendering on terms, and where some of the women and children were still in the enemy's hands. He had to force his way through terrible odds, but he made good his ground, and on the 16th of July he defeated and destroyed a force of about 5,000 mutinous sepoys—his own force being 1000 Europeans and about 300 Sikhs. On the 17th he entered Cawnpore, too late notwithstanding all that he and his noble army did to save their unhappy countrymen, yet he led in the event an almost irresistible advance, and actions against overwhelming odds. Hardly waiting to give rest to his men, or to pay the last rites of sepulture to the mangled corpses of those who had been vilely murdered in Cawnpore, he took the field again on the 19th of July he again inflicted a severe defeat on the mutineers, and finding that Nana Sahib had evacuated his stronghold of Bitbor, renewed his march. But he had to fight at every step, stout fortresses had to be captured, and at length after, on the 16th of August, achieving his ninth victory over six times his own numbers, he found his road so reduced by death, wounds, and sickness, as to render it imperative on him, after almost coming within sight of the British defences, to make an arrangement to recall to England without being able to communicate cheering words to the besieged. Being strengthened by the arrival of General Neill with a small additional force, and joined by his old commander, General Sir James Outram, Havelock at the head of a force of 3000, crossed the Ganges on the 19th of September. Sir James Outram—one of the best and bravest of the many officers who have achieved eminence in India—would of course, as the superior in rank, in the usual order of things, supersede Havelock as commander, but with the generous charity of a true-hearted warrior, he in an order of the day announced to the army that "in gratitude for and admiration of the brilliant deeds in arms achieved by General Havelock and his gallant troops," he would "continue to order the force to Lucknow in his civil capacity as chief commissioner of Oude, tendering his military services to General Havelock as a volunteer." On the 21st of September the fortified position at Meeranhour was forced; on the 25th Lucknow was reached, and the garrison, which had been blockaded for nearly four months, relieved, just as it had been mined and was ready to be blown up by the besiegers. The following day the intramurals of the enemy were stormed, though with great loss, including that of the gallant General Neill.

On the 17th of November, Sir Colin Campbell, after four days' operations and some very severe fighting, forced his way into the residency at Lucknow, and the garrison was relieved and allowed to form up in the fortresses of Alambagh, near Lucknow, on the 4th of November, 1857.

We need hardly add that the splendid march of Havelock on Cawnpore and the relief of Lucknow have not merely rendered him the popular hero of the Indian war, but added new glories to the British arms. As a reward for his eminent services he was created (Sept. 1857) a Major-General in the army, his promotion bearing date July 30, 1857, made a Baronet, and raised to be a Knight-Commander of the Bath, and, in accordance with a royal warrant, was elected a Fellow of the Royal Society. He was now 40 years of age, and had spent 19 years in the service, 5 of which were at home, 2 at Cawnpore, and 12 at Lucknow. He had now accomplished a great work, and was in full possession of the highest honours that a soldier can aim at. His reputation was established; and, with the promise of a bright future, he was allowed to return to England to be present at the marriages of his sons.

HAYDON'S CANALS. [Tintines, Organo, &c.] HAWK-MOTH. [Springside.]

HAYDON, BENJAMIN ROBERT, was born January 22d 1786 at Plymouth, where his father was a bookseller. Haydon was educated at the public schools at Plymouth, and afterwards at the Plymouth grammar-school, where Sir Joshua Reynolds had received his education. Haydon's father drew a little himself, and had a taste for art, and was delighted to see his son turn to painting. He was, indeed, there was no other son, to adopt his business, and Benjamin was accordingly apprenticed. But the youth hated the business, and expressed his resolution to become a painter so determinedly, that after much opposition his father consented to his scheme. On leaving his father's house, his Prince Flore, a friend of the family, got him introductions to Northcote and Opie, and afterwards to Fuseli, keeper of the Royal Academy, by whom he was readily admitted as a pupil. He was a student at the studio of Fuseli; and, at the age of eighteen, an enthusiast for Raphael, Inchbold, and high art, Benjamin Haydon commenced his career. Here he drew with great earnestness, and soon acquired great readiness of hand. He also spent much time in dissecting and the study of anatomy, and was able to produce a very fine amount of knowledge. But his studies were too desultory and interrupted, and there could be little doubt that the weakness of his eye—he had while a youth been for a short time quite blind—was a great hindrance to successful study in this point of view. With form and chiaroscuro he succeeded, and others subsequently famous, were his fellow-pupils, yet he seems to have been generally regarded as one of the most promising students in the institution, while he was a great favorite with the masters.

Haydon exhibited his first picture at the Royal Academy in 1807. The title alone will show the daring of the young painter, "Joseph and Mary resting with our Saviour after a day's journey on the road to Egypt." Mr. Hope, author of "Antiquities," became the purchaser of this picture. The reputation which the artist gained by it gave him increased energy and ambition. "Dentatus" was the subject chosen by him next year; and from this period Haydon dates the commence ment of the union between the English and the Royal Academy, whom he accused of illiberality on every point, and who retorted with "Dentatus" where it could not be seen, and of a fear of historical painting as the cause of their refusal to admit him as an associate, while they admitted less skilful artists. The purchase of "Dentatus" by Lord Molyneux in the following year was exhibited in the British Institution, where it received the praises of the public, and the prize of the committee. About this time the Elgin Marbles were first exhibited in London, and Haydon's enthusiasm about them was unbounded. He painted Sir William traces, a historical picture, and in 1812. His "Venus and Anchises" were purchased by Lord Molyneux for 400 guineas; his "Alexander returning in triumph, after vanquishing Bucephalus," found a purchaser at 500 guineas in the Earl of Egremont; and his "Venus and Anchises" was purchased by Lord Talbot for 500 guineas. Haydon now got diverted from steady and constant application to painting by his fondness for controversy; and the attacks he published on the Royal Academy, by estranging him from some personal friends among artists and the patrons of art, greatly exasperated his temper, and there can be little doubt produced a lasting ill effect on his fortunes. From this time his life was to a great extent one of strife, and of constant struggle with pecuniary difficulties. Still he was at no time without friends. Sir G. Beaumont gave him a commission for a subject from Maccaboth, a 'Judgment of Solomon' was bought by Mr. Ellford and Mr. Tingcomb for 400 guineas; his 'Alexander returning in triumph, after vanquishing Bucephalus,' found a purchaser at 500 guineas in the Earl of Egremont; and his 'Venus and Anchises' was purchased by Lord Talbot for 500 guineas. Haydon now got diverted from steady and constant application to painting by his fondness for controversy; and the attacks he published on the Royal Academy, by estranging him from some personal friends among artists and the patrons of art, greatly exasperated his temper, and there can be little doubt produced a lasting ill effect on his fortunes. From this time his life was to a great extent one of strife, and of constant struggle with pecuniary difficulties. Still he was at no time without friends. Sir G. Beaumont gave him a commission for a subject from Maccaboth, a 'Judgment of Solomon' was bought by Mr. Ellford and Mr. Tingcomb for 400 guineas; his 'Alexander returning in triumph, after vanquishing Bucephalus,' found a purchaser at 500 guineas in the Earl of Egremont; and his 'Venus and Anchises' was purchased by Lord Talbot for 500 guineas.

His next great work was 'Christ's Entry into Jerusalem,' began in 1814, but not exhibited till 1826, when it formed part of an exhibition of his own in Bond Street. The picture did not sell, but this did not prevent him from painting 'Christ in the Garden,' and 'Christ Rejected.' In May 1821 he married. His 'Raising of Lazarus' was painted in 1823. About 1815 he began to receive pupils, his first being the Landseers—Edwin, Charles, and Thomas—and his purpose being "to form a school, and to establish a better and more regular system of instruction than even the Academy offered." With many drawbacks he made a good teacher, and some of his pupils became distinguished. He sold his pupils, but he was ill fitted to carry on such an institution with the necessary regularity. He also became connected with Mr. Elmes in the conduct of the 'Annals of the Fine Arts,' and that publication became a vehicle for constant attacks by the Academy. Haydon retaliated as ably as possible by Mr. Elmes) on Haydon and his pupils. But the school could not so prosper, the writing brought in no money, and his painting, when not neglected, was not of a kind to attract the public. With a little encouragement he would have been an inmate of the King's Bench prison. Here he found a subject for a successful picture in the 'Mock Election,' which took place within those walls in July 1827. George IV purchased this work for 300 guineas. Haydon followed it with another for Lord Mountstuart, which was sold for 300 guineas to Mr. Francis of Exeter. He had previously regained his liberty with the assistance of Google Books
Haydon's next subjects, after making an unsuccessful attempt to obtain employment as a portrait painter, were 'The Great Banquet at Guildhall' at the passing of the Reform Bill, and 'Napoleon' at the Treaty of Tilsit. The former was considered a failure, but the latter met with great success. 'The Duke on the Field of Waterloo' fell far short of this, both in merit and public estimation. Again in 1818 he became a prisoner for debt in the King's Bench, but after a short imprisonment was able to subscribe the balms and moderate his expenditures. He now engaged with great zeal in lecturing on painting at various literary institutions in London and the provinces, and his lectures were everywhere attended with success.

The determination of the government to decorate the interior of the new houses of parliament with pictures opened a new and grand field before the imagination of Haydon. He had petitioned, written, and lectured in favour of adorning our public buildings, and impressed with a very high notion of his own capacity for executing such works, his sanguine temperament never permitted him for a moment to doubt that he would be one of the painters selected for the task. Accordingly, finding that his name was not in the favor with the board of the azure chapter, he determined himself to acquire mastery over the use of that material, and when the cartoon competition was summoned, he addressed himself eagerly to the preparation of a cartoon. The judges gave in their opinion in his favor; but he was forewarned that the successful competitors, even of the third class, was a death blow to all his hopes; and though he struggled bravely against the disappointment, he never really recovered the shock. His last works were 'Uziel and Siaton'; 'Currituck leading into the Gulf', 'Alfred and the Tyrolese', 'By Jove!', 'The Burning of Rome,' and numerous repetitions of his 'Napoleon.' 'Alfred,' and 'The Burning of Rome,' were exhibited in 1846 at the Egyptian Hall. The exhibition of 'The Death of Nelson' at St. Helens, and the extensive inquiries which his success excited, so incited Haydon's mind now entirely gave way under his misfortune. He died by his own hand, June 22, 1846. It should be added that a post mortem examination showed that there had been long standing disease of the brain. He left a wife and family, for whom a public subscription was immediately got up. It is not a little to the honor of Sir R. Peel, that, at what was perhaps the most busy and exciting period of his parliamentary career, he had found time just five days before the painter's unhappy death, to order the portrait of the painter from the impression of Haydon's 'Lectures' are almost his only contributions to literature. Considerable difference of opinion exists as to his merits as a painter. The exaggeration and hardness, which have been so much disapproved of his style, are ascribed to his early intimacy with and imitation of Fuseli; but unjustly; they are Haydon's own, the result partly of insufficient study, partly of incomplete artistic education, more of his peculiar physical temperament, and habit of working. But he had many merits, and he did much to raise the character of English art, and to extend an interest in and a love of it. For a fair and far from partial review of the character of Haydon as a man and an artist, the reader is referred to the concluding part of the third volume of Taylor's 'Life of Benjamin Robert Haydon,' 2nd ed., 5 vols., 1855. HAYNES. [MINN LIVE, S. J.]

HEAD, BIR GEORGE, Knight, was born in 1722, at the Hermitage, a few miles north from Rochester, in Kent. James Rooper Head, father of Sir George Head and Sir Francis Bond Head, was descended from Fernando Mendero, a Jew, who came from Portugal to England, and was physician to King Charles II. The father of James Rooper Head, married a daughter of the Rev. Sir Francis Head, Bart., of Ancaster, in Lincolnshire. George Head spent his early years at his father's residence, the Hermitage, and was afterwards educated at the Charter Houses School, London. Early in 1808 he obtained a commission to serve with the West Indies Militia and having obtained leave of absence, in the spring of 1809 he went to Portugal, where he accepted the humble situation of a commissariat clerk, and joined the British army under Lord Wellington at Badajoz. He was afterwards appointed to the commissariat department of a brigade. After Mamezen had retreated from the lines of Torres Vedras, and the battle of Fuente d'Onor had been fought, May 5, 1811, he was appointed deputy assistant commissary general, and attached to the army of the division of Sir Thomas Picton. In 1812 he was directed to proceed to Momento de Beira to establish the commissariat department of the third division under Sir Thomas Picton. He was present at most of the great battles in the Peninsula, as well as the concluding victory of the army under Sir John Moore at Salamanca. In 1814 he was in Canada in the North Social Department, and in 1818 there five years on the peace establishment. After his return to England he described his experiences and adventures in America in his 'Forest Scenes and Incidents in the Wilds of North America, being a Diary of a Winter's Route from Halifax to the Canadian Lakes, and in Four Months' Residence in the Woods on the Borders of Lakes Huron and Simcoe, by George Head, Esq.,' 2mo, London, 1819. In 1831 he received the knighthood of knighthood. Encouraged by the favourable reception of his works in London, he determined to tour through the Manufacturing Districts: also Memoirs of an Assistant-Commissary General, by Sir George Head, 12mo, 1837. The first Tour includes most of the large manufacturing towns in the northern part of England; the second, the island of Man, the lakes of Scotland, the Shannon, and part of Ireland. They contain a large amount of information carefully collected and clearly stated concerning the places visited and the manufactures carried on in them. Both Tours were published by the author, a Tour of Many Days.' He was also the author of several articles in the 'Quarterly Review,' and translated from the Italian the 'Historical Memoirs of Cardinal Foxos,' 2mo, 1800, and from the Latin, 'The Metamorphoses of Apollodorus,' 8vo, 1821. He died in London, May 2, 1855, unmarried.

HEADINGTON. [OXFORDSHIRE.]

HEALTH, PUBLIC. [PUBLIC HEALTH, S.]

HEART. One of the most interesting inquiries in connection with the human heart is that the presence of considerable light has been thrown by modern research. The circulating system is not perfected until the moment of birth; and in its several transitory stages of growth it resembles the guttae, or tiny blood-vessels, of the lower animals. As the egg of the bird affords the best means of studying these changes, we give an outline of them from Dr. Carpenter's 'Physiology':—

At an early period of incubation the yolks, or discs, are enveloped by a germinal membrane, composed of distinct cells, which is divisible into three layers; and a thickened portion of this is easily distinguishable, at which the embryo will subsequently evolve.

The middle layer gives origin to the circulating system, and is therefore termed the 'vascular layer.' The thickened portion of this that surrounds the germ soon becomes studded with numerous irregular points and marks of a dark yellow colour; and as incubation proceeds these points become more applied and finally elongate and form the heart-lungs, which are united together, first in small groups, and then into one net-work, so as to form what is called the 'vascular area.' A large dark spot of a similar kind is seen in the situation to be subsequently occupied by the heart. The dark spot in France, are formed by the collection of blood-corpuscles, which originate in the transformation of the cells of the embryo and of the germinal membrane; and the rows and masses of blood-discs seem at first to lie in many channels, the walls of the heart and blood-vessels that subsequently include them.

From the first however a definite plan is perceptible: the network of capillaries that is formed over the vascular area being supplied with blood by the ramifications of a pair of arterial trunks, whilst the blood is collected from the circular venous sinuses which bounds the area, and is re-
turned to the embryo by the various trunks. In the blood-vessels which are first observed in the body of the embryo, as well as in the vascular area, no difference is at first perceived between the characters of the arteries and those of the veins, and these are only to be distinguished by the direction of the currents of blood circulating through them.

But at about the fifth hour of incubation the costs of the arteries begin to appear thicker than those of the veins, and the distinction between them soon becomes evident. After the principal vessels are formed, the development of new ones takes place in the same manner, according as they are to occupy the interstices already occupied by previously formed, or are to extend themselves into out-growing parts. In the first of these cases the new capillaries appear to be formed, like the original ones, from stellate cells, which arise secondarily from a network of blood vessels already present, and which, as soon as they are formed, become continuous with the large vessels and receive the current into their own cavities, to transmit it to some other vessel. But in the second, the new vessels are formed entirely by extension from those already existing. This takes place in the following mode.—Suppose a line, or arch, of capillary vessels passing below the edge, or surface, of a part to which new material has been superadded; the vessel will at first present a slight dilatation in one, and coincident enlargements in the remaining vessels, but only when the edges yielded a little near the edge or surface. The slight pouch thus formed gradually extend, as blind canals, or verticula, from the original vessels still directing their course towards the edge or surface of the new material, and crowded with blood, as soon as it is formed, into this new stream. Still extending, they converge, and meet; the partition wall that is at first formed by the meeting of their closed ends clears away, and a perfect arch tube is formed, through which the blood, diverging from the main or former stream, and then following it, is being continually propelled. This last process may be seen in the growing parts of the tail of the tadpole, in the development of the filamentous gills and legs of the water-nat, in the first evolution of the extremities of the tadpole, and in the formation of new structures in the fully-developed organs, either for the repair of injuries or as the result of morbid processes. In some instances it would appear that the wall of the newly-forming vessel gives way, and that the blood-corpuscles escape from it into the parenchyma, at first collect- ing in an undefined mass, but soon manifesting a definite direction, and coming into connection with another portion of the arch, or with some adjacent vessel. Thus, then, a channel, and not a vessel is formed; and it is probably in this way that the arches and veins of fishes, as well as those of those vertebrates which have arches but no veins, are produced in many of the lower tribes of animals, and also, according to Mr. Paget, in some of the softer and least organised worms in man:

The origin of the heart appears about the 24th hour, and is a mass of cells, of which the innermost soon break down, so as to form a tubular vessel; for some time it is simple and undivided, extending however through nearly the whole length of the embryo; but the posterior part may be regarded as corresponding with the future atrium, since prolongations may be perceived extending from that part into the transparent area, which indicate the place where the veins subsequently enter. Although the development has proceeded thus far at about the 24th hour, no motion of fluid is seen in the heart or vessels until the forty or fifth hour. When the heart, which may be considered as analogous at this period to the dorsal vessel of the Annulida, first begins to pulsate, it contains only colourless fluid mixed with a few globules. A momentary flow of blood into the arches and veins of the vascular area is at the same time perceived; but this is independent of the contractions of the heart, and it is not until a subsequent period that such a communication is established between the heart and the distant vessels, that the dark fluid contained in the arches and veins of the vascular area is first propelled by its pulsations. This fact which we have just seen to possess a very important bearing on the theory of the circulation, and which has been denied by some observers, appears to have been positively established by the latest researches of M. v. Baer.

The contraction of this dorsal vessel (for so it may be termed) begins, as in the Annulida, at its posterior extremity, and gradually extends itself to the anterior; but between the 40th and 45th hours, a portion of the arch which is effected by a constriction round the middle of the tube; and the dilatation of the posterior portion becomes an aortic arch, and that of the anterior a ventricular cavity. Between the 50th and 60th hours the circulation in the vascular area becomes more vigorous, and the action of the ventricle is no longer continuous with that of the atrium, but seems to proceed at a separate period. At the same time the tube of the heart becomes more and more bent forward, so that it is thus much shorter relatively to the dimensions of the body, and is more confined to the portion of the trunk to which it is subsequently restricted. The convex side of the curve which the tube presents becomes the apex or point of the heart, and between the 50th and 60th hours this is seen to project forward from the breast of the embryo, much in the situation it subsequently occupies. About the same time the texture of the atricle differs considerably from that of the small vessels, becoming thinner and thinner, and membranous walls which it at first possessed; while the ventricle has become stronger and thicker, both its internal and external surfaces being marked by the interlacement of muscular fibres, as in the higher Molussae. About the 60th hour the grade of development of the heart may be regarded as corresponding with that of the fish, the atricle and ventricle being quite distinct, but their cavities are as yet quite single. The heart of the dog at the 21st day bears a great resemblance to the heart of the chick, for at the 60th hour; it consists of a membranous tube twisted on itself and divided into two principal cavities, besides the bulb or dilatation which at this period is found at the commencement of the sorts, and which corresponds with the bulbæ arteriosæ of fishes.

Having thus traced the evolution of the heart of the chick up to the grade which it presents in fishes, we may now inquire what is the condition of the other parts of the vascular system at the same time. At the end of the second day the primitive arterial trunk is seen to be divided into two canals, which separate from one another to inclose the pharynx, and then unite again to form the aortic trunk, which passes down the spine. During the first half hour of the third day a second pair of arches is formed, which encompases the pharynx in the manner described; and at the end of the third day two other pairs of vascular arches are formed, so that the pharynx is now encompassed by four pairs of vessels, which unite again to supply the general circulation. These evidently correspond with the arches and arterial branches of fishes, although no respiratory apparatus is connected with them; and in fact the distribution of the vascular system of the bird on the fourth and fifth days exactly resembles that presented by many cartilaginous and bony fishes, as seen in the tadpole of Rana. The development of the first pair of arches is obliterated about the end of the fourth day, but a pair of vessels which is sent from it to the head and neck-organs, and which afterwards remains as the third arch. This pair of arches is given off by the arch which previously existed, and proceeds in the same manner as the fourth from the ascending to the descending sorts. On the fourth day the second arch also becomes less, and on the fifth day is wholly obliterated, whilst the third and fourth become stronger. From the third arch, now the most anterior of those remaining, the arteries are given off which supply the upper extremities; and the veins of the head are now brought into connexion with it by means of the communicating branches, which previously joined the third with the second arch. When these vessels are fully developed, the branches by which these arches formerly sent their blood to the head and neck, disappear, so that about the thirteenth or fourteenth day the whole of the blood sent through the two anterior arches is carried to the head and upper extremities, instead of being transmitted to the descending sorts as before. There now only remain the two vessels, which are now called the fifth pair of branchies, and the development of which into the sorts and pulmonary arteries will be described in connection with the changes which are at the same time going on in the heart. During the fourth day the cavities of the heart begin to be divided for the separation of the right and left auricle. At the 80th hour the commencement of the division of the auricle is indicated externally by the appearance of a dark line on the upper part of its wall, and this after a few hours is perceived to extend as a continuous line from the left ventricular cavity, divides it into two nearly spherical sacs. Of these the right is at first much the larger, and receives the great...
systemic veins; the left has then the aspect of a mere appendage to the right, but it subsequently receives the veins from the hypogastric organs and acquires an increased size. The septum between the arieties is by no means completed at once; a large aperture (which subsequently becomes the foramen ovale) exists for some time at its lower part, so that the ventricle continues to communicate with the arieties as a whole; this is often closed by the prolongation of a valvular fold, which meets it in the opposite direction; it remains pervious, however until the animal begins to respire by the lungs, and sometimes is not completely obliterated even then. The division of the venous system is also hastened by the absorption of the septum, and is effected by a sort of duplicature of its wall, forming a fissure on its exterior and a projection on its interior; and thus a septum is gradually developed within the cavity, which finally incloses the right atrium and rises higher up, until it reaches the entrance to the bulb of the aorta, where some communication exists for a day or two longer. At last however the division is complete, and the inter-ventricular septum becomes continuous with the inter-auricular, so that the heart may be regarded as completely divided in two. The progressive stages presented in the development of this septum are evidently analogous to its permanent conditions in the various species of reptiles; but it must not be lost sight of that in all reptiles the inter-auricular septum is first determined, and the separation of the arieties into two branches, in which the inter-ventricular septum is absent or imperfect. The changes which occur in the heart of the Mammalia are of a precisely similar character, and as they take place more slowly than in the bat, are more clearly connected with environmental influences. After the septum of the ventricles begins to be formed in the interior a corresponding notch appears on the exterior, which as it gradually deepens renders the apex of the heart double. This notch between the right and left ventricles continues to become deeper until about the eighth week in the human embryo, when the two ventricles are quite separated from each other except at their bases; this fact is very interesting from its relation with the similar permanent form of the Dogong. At this period the internal septum is still imperfect, and particular cavities communicate with each other, as in the chick on the fourth day. After the eighth week however the septum is complete, so that the cavities are entirely insulated; whilst at the same time their external walls become more connected towards their bases, and the notch between them is diminished; and at the end of the third month the ventricles are very little separated from one another, though the place where the notch previously existed is still strongly marked.

A knowledge of the changes which go on in the development of the heart enables us to explain some of the malformations to which it is subject. (Carpenter, Principles of Physiology, General and Comparative.)

HEATHER. [Enica.]

HEIMA, a genus of Plants belonging to the natural order

Lythraceae. It has a hemispherical campanulate calyx, bracteolate at the base, with six erect lobes and as many alternate branches, with three alternate with erect lobes; stamens 12, somewhat equal; ovary sessile, nearly globose, 4-celled; capsule included within the calyx; seeds numerous, minute, and wingless. Glabrous herbaceous plant.

Petunias l-flowered, shorter than the calyx.

H. salicifolia. New Zealand. — A plant of the volcano of Jorullo. It has ternate or opposite leaves, the upper often alternate, on very short stalks, lanceolate, acute, narrowed to the base. The petals are obovate. It is a powerful auditive and diuretic. The Mexicans consider it a valuable medicine, and call it Hanchillo.

HEINE, HEINRICH, was born on the 1st of January, 1800, at Düsseldorf, in the Prussian Rhine-Province, of a learned Jewish family. He was educated at the Lyceum at Düsseldorf, and as he was intended for the mercantile profession, he was sent in 1818 to Hamburg, to receive the necessary instruction and training. He remained there till 1819, when his father, as well as his uncle, Solomon Heine, a banker in Hamburg, expressed the wish to be educated for a literary profession, and in the summer of that year he was sent to the university of Bonn, in order to study jurisprudence. In 1830 he went to Göttingen, but soon left it, and in 1831 removed to Berlin, where, in 1832, he became an adjutant to the Magistrate of the 'Gedichte, von Heinrich Heine,' 12mo. Some of the earliest of these productions date as far back as 1816, and several of them had previously appeared in the periodical called 'Der Vater der Vaterlande,' or 'Vater und Vaterland,' which he published, and after his return to Berlin published his remarks in the 'Gesellschaft.' In 1833 he published his tragedy of 'Alceste,' together with a one-act tragedy named 'William Radecliff,' and a 'Lyrisches Intermezzo.' While he remained at Berlin he also published in the 'Spracher' a series of letters under the head of 'Briefe ans Berlin,' which attracted much attention. In 1833 he returned to Göttingen, and resumed his studies in jurisprudence. On the 30th of July, 1835, he took a degree in law, and then proceeded to Hanover, where he began to make himself known as an advocate. The practice of the law however seems to have been as little suited to the character of his mind, now developing itself, as the pursuits of trade. He appears about this time in a letter addressed to his father, who remonstrated against the change of his profession, to have been taken with the idea that the change from the New to the Old Testament, in the Lutheran form, but afterwards became an unbeliever. While at Göttingen, in 1834, he made a tour in the Harz Mountains, of which he published an account at Hamburg, 'Die Harrenise.' 1835. His afterwards made tours in the islands of the North Sea, in England, to South Germany, and to Italy, and wrote a descriptive account of each. The whole of these, including the 'Harrenise' were published at Hamburg under the title of 'Reisebilder, vol. 1-2 in 1835-37, and vol. 3 in 1835-39. The former contains letters written in French under the title of 'Impressions de Voyages.' 1837 He published at Hamburg another volume of short poems, the 'Buch der Lieder,' and about the same period his poem of 'Alta Trol, ein Sonnemachtszegern.' After his return from England he was employed at Stuttgart as the editor of the 'Neue Politischen Annalen.' He also wrote for the 'Morgenblatt,' and the 'Augsburger Zeitung,' and of the latter he became afterwards the Paris correspondent.

In 1837 he removed to Paris, where he was enabled to reside during the remainder of his life. In this year he published his series of letters 'On Nobility' ('Über den Adel'), Hamburg, 1831. In 1838 he published an essay on modern literature in Germany, 'Zur Geschichte der Kunste in Deutschland,' in 1838. His travels in France and in England, and his remarks on the state of France, 'Französische Zeitungen,' 12mo, Hamburg, which is a collection of articles previously published in the 'Augsburg Gazette,' 'Der Salze,' one of the most important of his prose works, was published at Hamburg, in 4 vols. 8vo, 1834-40. About this period he married a Frenchwoman, who was a Roman Catholic, and married her according to the Roman Catholic ritual. His observations on the 'Romantic School' ('Die Romantische Schule') appeared in 1836 at Hamburg. In 1840 he published his bitter personal attack on Börne, with whom he had become acquainted when he went to Paris in 1831, 'Über Ludwig Börne,' 8vo, Hamburg. In the winter of 1843-44, Heine visited Germany for the last time. He then returned to Paris he published his 'Deutschland, ein Wintermärchen' ('Winter's Tale'), which is a description of his journey. In 1847 he experienced an attack of paralysis, which deprived him of the sight of one eye. In 1848 he went to Lausanne; in 1845 he returned to Paris. In 1848 deprived him of the sight of the other eye also, and subjected him likewise to extreme bodily suffering, without all injuring his mental faculties. He never afterwards left his chamber, but continued his literary labours by the light of a small lamp. He died at his villa of Montenot, near Paris, only interrupted occasionally by the severity of his sufferings. His latest poetical productions were the 'Romancer,' written in 1850-51; 'Das Buch des Lazarus,' written in 1854, and 'Nener Frühlings' ('New Spring'), written in 1855. In July 1856 he published at Paris, in the 'Biblio-
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these Contemplations," a translation of his poems into French prose, under the title of 'Poèmes et Legendes, by Harri Heine.' The translations were made under his own supervision by his friend, the late Gérard de Nerval. A similar translation of the 'Nouvelles' of Flaubert appeared in this 'Rêves des Mondes,' vol. xi. 1885. His state of body suffering, during which he was dutifully attended by Madame Heine, was terminated by her death, on the 17th of February, 1886. Since Harri Heine's death, his brother, Dr. Gustav Heine of Vienna, communicated to the 'Freundebliet' of that city some particulars of his last moments, together with the seventh clause of his will, in which he says, 'Though I believe that I do not deserve to be followed to the grave by any clergyman of that denomination, and I wish to dispense with any other sacred solemnity at my burial. This is not the weak fancy of a freethinker. For the last four years I have cast aside all philosophical pride, and have again felt the power of religious truth.' He regrets having so often spoken of sacred subjects in a disrespectful manner, and implores 'forgiveness for any offence which in his ignorance he may have given to good manners and morals, which are the true emanations of all faith.'

HEIRATH. (Heir.)

HERB. [Parma.] HERBARIUM, the name given to specimens of Plants when they have been collected and dried. The possession of an herbarium is almost essential to the study of systematics. By it the student of Botany is enabled to cultivate at once the larger proportion of the species of plants which inhabit the earth's surface. The use also of an herbarium will be found constantly to supply the place of recent plants. Hence all persons who study botany possess themselves of an herbarium made up at the expense of nature of their studies. The following hints for forming an herbarium are chiefly derived from Professor Balfour's valuable 'Class-Book of Botany':—

The specimens to be kept in the herbarium should, if possible, be gathered in fine weather, and free from external moisture. In selecting them care should be taken to have the plants in a perfect state of growth, with all the parts from which the characters of the order, genus, or species, are taken. The entire plant, where practicable, should be preserved. Of course this is impossible with trees, but the complete the specimen the better for study. In trees, portions of the branches, with the leaves, flowers, and fruit, should be taken, and, where possible, sections or small portions of bark, roots, &c. In the case of tall and slender grasses and sedges, they may be folded once or twice backwards and forwards, to make room for them on a single sheet. Thick branches, roots, stems, &c., may be cut into lengths of 3 or 4 inches, and inserted in the sections, with the courtesy of the researchers, both the staminiferous and pistilliferous flowers should be obtained. Some plants, as species of the genus Rubus and Salix, demand that both flowering and leafing shoots should be gathered. In gluing the plants on to the paper, care must be taken to expose two or three sides, so that all parts of the habit and structure may be seen. Careful dissections of plants may be dried and fastened on to paper, and these will facilitate subsequent examination very much. All bad, doubtful, injured, or imperfect specimens should be rejected.

In collecting plants a few rules are useful, and when gathered they should be placed in a tin box or vacuum till they are transferred to paper. Some plants require drying or pressure immediately. Under these circumstances, Dr. Balfour recommends both a flat and a sheet, so that all parts of the habit and structure may be seen. Careful dissections of plants may be dried and fastened on to paper, and these will facilitate subsequent examination very much. All bad, doubtful, injured, or imperfect specimens should be rejected.

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In putting down the plants the following plan should be pursued:—A parcel of not less than four sheets of paper is put on one of the outside boards, then one or more specimens are laid on this sheet according to their size. The specimens should be spread out carefully, their natural habit being preserved as far as possible. When plants require to be folded, the slips of paper already mentioned are passed over the bent portions so as to keep them in place. After placing one specimen or set of specimens on the sheet, another parcel of not less than four sheets is laid over them; and in doing this the leaves and other parts are arranged with the hand or the forceps. The slips of paper are then folded, and if necessary more such parcels have been arranged one over the other. Then a thin board is inserted, and other parcels of paper and specimens are arranged above it, until they are exhausted, or until the bundle is of sufficient size. Another such board is then inserted between the bundle and the forceps, as it is impossible to cultivate at once the larger proportion of the species of plants which inhabit the earth's surface. The use also of an herbarium will be found constantly to supply the place of recent plants. Hence all persons who study botany possess themselves of an herbarium made up at the expense of nature of their studies. The following hints for forming an herbarium are chiefly derived from Professor Balfour's valuable 'Class-Book of Botany':—

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first by immersion in boiling water. Aquatic plants and wet plants should be placed in a napkin and pressed before they are put into the paper. The moist paper will dry in ten or twelve hours. Along with the plant a label should be affixed, giving particulars known about the specimen, as where gathered, what elevation, &c.

When the specimens are thoroughly dry a selection is made for the herbarium. These should be fastened by means of a spot of gum on a wide paper, which comes long and 10½ inches broad. The name of the plant, its locality, or any other particulars, may be then written on the paper. In order to preserve the specimens from the attacks of insects, &c., they should be touched with a strong solution of corrosive sublimate, or sublimate powder, or in a solution of naphtha (half a drachm to the ounces). The sheets may then be arranged in a case, according to their genera or natural orders.

Fruits, specimens of wood and bark, large roots, lichens and algae on rocks and stones, may be arranged in drawers, glazed cases, or glass jars. Succulent fruits and roots are best preserved in a strong solution of salt and water, or in pyrogallic acid, diluted with 3-5 parts of water, or in alcohol. In some instances a solution of 4 ounces of bay salt, 3 ounces of burnt alum, and 5 grains of corrosive sublimate, in 2 quarts of boiling water, has been used with advantage. These jars are best covered with a stout piece of camphor tied round the neck.

HERCULES. A genus of Plants belonging to the natural order Porophyceae. It has 5 sepals; 5 stellate petals inserted with the 5 stamens on a perigynous ring; 2 stigmas nearly sessile; fruit 1-seeded, indehiscent, membranaceous, leathery, brown in colour, and containing several seeds in place. Three have been recorded as natives of Great Britain. One, H. hercula, is a downy native; the other two are very rare.

H. glabra has a prostrate herbaceous stem, with clusters of small white flowers coalescing on the lateral branches into slightly leafy spike. It has been found in Suffolk and Lincolnshire in England, and in West Kerry, Ireland.

H. ciliata. The sepals are tipped with a large bristle; the clusters of flowers are distinct, sessile, and axillary. It has been found at Lizard Point, Cornwall.

HERMINIUM, a genus of Plants belonging to the natural order Orchidaceae and the tribe Ophrydineae. The perianth is bell-shaped, segments all erect; lip 3-lobed, tumid beneath at the base, without a spur; glands of the stalks of the pollen-masses exserted, naked. H. monorchis, the Musk Orchis, is a British species. The stem is about six inches high, and the spike of flowers is dense and slender; the sepals are ovate and greenish.

HERNAY, or HERNAWAY, a name for the Common Heron. (Héron.)

HERON'S BILL. (Erodium, L. H.)

HERSCHEL, CAROLINE LUCREZIA, the sister of the great astronomer Sir William Herschel, was born at Hanover on the 16th of March, 1760. Till her twenty-second year she lived with her parents in her native place; after which she came over to England with her brother, then established as an organist at Bath. When Sir William exchanged his profession as a musician for those of astronomical labour which were to immortalise his name, his sister became his constant and most valuable helper. "First of all," he says, "he procured his astronomic results," a saying which is often repeated by an authority who writes from intimate knowledge, "her attendance on both his daily labours and nightly watches was put in requisition, and was found so useful that, on his removal to Datchet and subsequently to Brough, she performed the whole of the arduous and important duties of his astronomical assistant—not only reading the clocks and noting down all the observations from dictation, as an amanuensis, but subsequently executing the whole of the extensive and laborious numerical calculations necessary to render them available for the purposes of science, as well as a multitude of others relative to the various objects of theoretical and experimental inquiry in which, during his long and active career, he was at no time engaged. For these labours she was in receipt of a moderate salary allowed her by George III. But, in addition to these labours performed expressly as her brother's assistant and amanuensis, she found time to perform others of a similar character on her own account. Though living up frequently all night till day-break, more especially in winter, while her brother required her help, she was able, by snatching such intervals of time as her brother's occasional absences permitted, to conduct a series of observations on her own with a small Newtonian telescope, which he had constructed for her. Her special employment with this instrument was to sweep the heavens for comets; and so successful was she in this employment that she discovered seven comets, of at least five of which she was situated to have been the first to observe. The dates of the discoveries of the seven comets were as follows:—August 1, 1786; December 21, 1786; January 9, 1790; December 16, 1791; October 7, 1793; November 7, 1793; August 6, 1797. Besides the discovery of these comets, she had the merit of having discovered a new species of nebulae and clusters of stars, included in her brother's catalogue.

In 1796 she published, with an introduction by her brother, an astronomical work of great value, entitled 'Catalogue of Stars,' taken from Mr. Flamsteed's tables, contained in the second volume of the Historia Coelestis, and not inserted in the British Catalogue, with an Index to point out every observation in that volume belonging to the stars of the British Catalogue: to which is added a collection of Errata that should be noticed in the same volume. In this work, which was published at the expense of the Royal Society, no fewer than 661 stars observed by Flamsteed, but which had escaped the notice of the framers of the 'British Catalogue,' were pointed out. During the whole of her brother's residence at Hanover, she was employed by his side, aiding him and modestly sharing the reflection of his fame. After his death, in 1822, she returned to her native Hanover to spend the remainder of her days. They were annually visited by her brother's friends, and, more particularly, by several remarkable nebules and clusters of stars, included in her brother's catalogue.

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HESKET-NEWMARKET. [Cumberland.]

HESPERIDIN. [Chemistry, S.]

HETEROGYNA. [Hydrophytae.]

HEZEL. [Herb., 1874.]

HETTON. [Durham.]

HEYTESBURY. [Wiltshire.]

HEBBERTIA. [Dilleniaceae.]

HEVITE. [Chlorophytaceae.]

HIGHAM-FERRERS. [Northamptonshire.]

HIGHWORTH. [Wiltshire.]

HILL, ROWLAND, VISCOUNT, was born on the 11th of August, 1772, at the village of Frees in Shropshire, where his father, John Hill, Esq., resided till the death of his brother, Sir Richard Hill, Bart., when he succeeded to the title, and removed to the family mansion and estate at Hawkstone in Shropshire. Sir John Hill had sixteen sons and daughters, of whom Rowland Hill was the second son and fourth daughter. In 1783 he entered the celebrated Hill, the celebrated preacher. He was educated in his native county, where he remained till 1790, when he entered the army as an ensign in the 35th regiment of foot. Having obtained leave of absence, he went to a military academy at Strasbourg, where he remained till January 24, 1794, when he was appointed lieutenant in an independent company under Captain Broughton. On the 16th of March, in the same year, he was appointed lieutenant in the 33rd, or Shropshire regiment. He went to pursue his military studies at Strasbourg, but returned to England at the end of the summer, joined his regiment at Edinburgh January 18, 1795, and remained in Scotland till the end of the year. He served in the West Indies, and returned to England in June. Lord Hood having taken Tolvm from the French in August 1795, Captain Hill, better
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he was attached to any particular corps, was employed there as an ordnance officer, and served in various capacities under successive Generals, Lord Malvern, General O'Hara, and Sir David Dundas. On the 13th of December, 1793, Lord Hood and Sir David Dundas appointed him the bearer of despatches to England, where he arrived on the 14th of January, 1794. In the early part of that year, Lord Graham (afterwards Sir Thomas Graham, and subsequently Lord Lynedoch) having raised a regiment of infantry, ordered Captain Hill the rank of major in it, on the condition of his supplying a certain quota of men, which he did. This regiment was the 80th, with which he served until he was despatched to win 2000 men, and he was promoted to the rank of lieutenant-colonel. On the 1st of January, 1800, he was advanced to the rank of colonel.

After the defeat of the French he returned to England, where he arrived on the 1st of April 1802. He performed regiments' duty in England and Ireland till 1805, when he accompanied the expedition to the river Weser in Germany, but was again in England at the end of January 1806, when he was appointed to the rank of major-general, and appointed on the staff.

In 1808, when he was on duty in Ireland, he received an order to join the army of Sir Arthur Wellesley in Portugal. He arrived there in time to serve with the 1st and 6th, and served under Sir Arthur Wellesley till the French evacuated Portugal, according to the terms of the so-called convention of Cintra. He afterwards served with his regiment under Sir John Moore in the latter part of 1808, till the battle of Corunna, January 16, 1809, when he returned with the shattered remains of the army to England.

After a short stay in England, Major-General Hill, in 1809, re-embarked for Portugal, in command of the troops ordered from Ireland for the next expedition, and was promoted to the rank of General. He served under Sir Arthur Wellesley till the 6th of February 1811, when he was compelled by illness to come to England. In May 1811 he was again in Portugal. In March 1812 he was invested by Lord Wellington with the insignia of the Order of the Bath, which he had been sent over for that purpose by the Secretary of State. He received a slight wound on the head at the battle of Talavera, and received the thanks of both houses of parliament for his services in that action, as he did on other occasions after the battle of Varennes. The General commanding in Chief of the Army—an office which he filled with universal approbation till the declining state of his health compelled him to resign his regiment. He was raised to the dignity of Wellesley, 5th, 1815, with remainder, as near as the second Viscount. He died December 10, 1842, at his residence, Hardwicke Grange, near Shrewsbury.

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The structure of plants and animals. The ultimate composition of organised bodies was unknown to ancient observers, as well as those who lived in the middle ages. It is true that Aristotle and Galen speak of homogeneous and heterogeneous parts of the body; and Malpighi, at the beginning of the sixteenth century, found still a little the idea that what are now called the tissues of the body, yet the more minute structure of these parts was entirely hidden from these observers. Even after the time of Malpighi and Leonardo da Vinci, men thought of looking for the same minute structural organization of the tissues till the beginning of the present century. We can only point to such men as Fontana, Musa, Lieberkühn, Huxton, and Prochaska, as having engaged in isolated observations upon the structure of various parts. It was not till the year 1746 that a connected view of the structure of the human body was given to the world, in such a form as to lay the foundations of what is now called the science of Histology. The 'Anatomie Nécessaire' (Paris 1746) of Bichat was in fact the first attempt to treat the subject of Histology scientifically. It was not so much that Bichat contributed new observations on this subject, as that he systematically arranged what had hitherto been done, and called attention to the importance of the subject, and to the fact that it lay at the foundation of all physiological and pathological inquiries.

In the direction of botany, the present century witnessed the observations of Robert Brown, who was the first to draw the attention of botanists to the importance of minute observations upon the tissues of plants. Of the earliest attempts at a systematic arrangement of the tissues of plants was made by Slack, in the 39th volume of the 'Transactions of the Society of Arts,' in a paper on the Elementary Tissues of Plants and in Vegetable Circulation. Observations were made on the way in which the cells multiplied, and a greater value and interest was given to these than they had before possessed by the observations of Schleiden on the origin and development of the cells of plants in his paper on Phytogeny, published in Muller's 'Archiv für Anatomie und Physiologie,' Part ii. 1838. He here pointed out, that in the formation of vegetable cells, small sharply-defined granules are first generated in a granular subsance, and around them the cell-nuclei (cyto- blastic Nuclei) appear which appear like granular coagulations around the granules.

The results of these observations were communicated in 1837 to Schwann, who, struck with the resemblance between the cells of animals and those of plants, conceived the idea that the same history of development would be found true of the parts of animals that had been discovered by Schleiden in the parts of plants. From this time the science of Histology made rapid progress, and we cannot more appropriately give this condition of the science than in the language of Professor Kölliker, in his introduction to his 'Manual of Human Histology':—

"In the year 1836 in fact the demonstration by Dr. Th. Schwann to the effect that the originally perfectly identical cellular composition of all animal and vegetable tissues is constant in all higher structures from these elements, afforded the appropriate conception which united all previous observations, and afforded a clue for further investigations. If Bichat founded Histology more theoretically by constructing a system and carrying it out logically, Schwann has by his investigations afforded a basis of facts, and has thus won the second laurels in this field. What has been done in this science since Schwann has been indeed of great importance to physiology and medicine, and a further fact of great value in a purely scientific point of view, inasmuch as a great deal which Schwann only indicated or shortly adverted to, as the genesis of the cell, the import of the nucleus, the development of the higher tissues, their chemical relations, &c., has received a further development, but all this idea has not amounted to a step so greatly in advance as to constitute a new epoch. If, without pretensions to precidency, it be permitted to speak of the future, this condition of Histology will last another century, when the essential advancement in the penetrating more deeply into organic structure, and becoming acquainted with those elements of which that which we at present hold to be simple is composed. If it be possible that such constituent cell-membranes, muscular fibres, axile fibre of nerves, &c., and the laws of their apposition and of the alterations which they undergo in the course of the origin, the growth and the activity of the present so-called elementary parts, should be made out, then a new era will commence for Histology, and the discoverer of the law of cell-genesis, or of a molecular theory, will be as much or more celebrated than the originator of the doctrine of the composition of all animal tissues out of the cell.

"In characterizing the present position of Histology and of its objects, we must by no means forget that, properly speaking, it considers only one of the three aspects which the elementary parts present to observation, namely, their form. It is the obligation of the last to unite itself with the second, in securing the correct understanding of the microscopic forms, and with the laws of their structure and development, not with any general doctrine of the elementary parts.

"Composition and function are only involved in as far as they are related to the origin of forms and to their variety.

"Whatever else respecting the activity of the perfect elements and their chemical relations is to be found in Histology, is there either on practical grounds, in order to give some useful application of the morphological conditions, or to complete them, as, from its intimate alliance with the subject, it is added only because physiology proper does not afford a due place for the functions of the elementary parts.

"If Histology is to attain the rank of a science, its first new concept of the mind and certain objective basis as possible. To this end the minuter structural characters of animal organisms are to be examined on all sides, and not only in fully-formed structures, but in all the earlier periods from their first development.

"The real value of the elements has been perfectly made out, the next object is to discover the laws according to which they arise, wherein one must not fail to have regard also to their relations of composition and function. In discovering these laws, here as in the experiments of those great physiologists and chemists, we must make our progress, and do not neglect to study the work of the mind, for the facts alone tell us what to do, and in the discovery of the fundamental wants of nature, and in the applications of their natural propositions or formulae provide, and thus the laws are enumerated.

"If we inquire how far Histology has satisfied these requirements, and what are its prospects in the immediate future, I think must be a moderate. Not only do we not possess a single law, but the materials at hand from which such should be deduced are as yet relatively so scanty, that not even any considerable number of general propositions appear well founded. Not the least in the ignorance which the microscopist possesses of the parts of animals in general, we cannot be acquainted with the structure of a single creature throughout, not even of man, although he has been so frequently the object of investigation; and therefore it has hitherto been impossible to proceed as near to its goal. It would however be unjust to overlook and depreciate what we do possess; and it may at any rate be said that we have acquired a rich store of facts, and a few more trustworthy propositions. To indicate only the more new investigations in the last decade we have a somewhat acquaintance with the perfect elementary parts of the higher animals; and that we also understand their development, with the exception of the elastic tissue, and of the elements of the teeth and bones. The mode in which these are united into organs has been less examined; yet on this head also much has been added of late, especially in man, those individual organs, with the exception of the nervous system, the higher organs of sense, and a few glands (the parathyroids, for instance), have been essentially investigated. If the like progress continue to be made, the structure of the human body will in a few years be so clearly made out that, except perhaps in the nervous system, nothing more of importance will remain to be done with our Comparative Histology.

"In a word, the subject at hand is of the most fascinating, as it is the most important, the subject of the observations of the times, and one which is advancing more than any other. With Comparative Histology it is otherwise: hardly commenced, not years but decades will be needed to carry out the necessary investigations. Whoever will do good work in this field must, by many means and in various ways, keep pace with the great progress from the earliest periods of development, obtain a general view of all the divisions of the animal kingdom, and then by the methods above described arrive to develop their laws.

"As regards the general propositions of Histology, the student will find them to be discovered in a monumental work by Schwann; however, much has been attained by the confirmation of the broad outlines of his doctrines. The position, that all the higher animals at one time consist wholly of cells, and de-
velop from these their higher elementary parts, stands firm; though it must not be understood as if cells, or their derivatives, were the sole possible or existing elements of animals. In the same way, Schwann's conception of the genesis of cells, though considerably modified and extended, has been essentially changed, since the cell-molecules still remain as the principal factor of cell-development and of cell-multiplication. Least advance has been made in the laws which regulate the origin of cells and of the higher elements; and on the formation of the placenta, the place during the formation of organs must be regarded as very slight. Yet the right track in clearing up these points has been entered upon; and a logical investigation of the chemical relations of the elements forming the animal structure furnish the most solid foundation of Deleers, Donhou, Ludwig, and others, combined with a more profound microscopic examination of them, such as has already taken place with regard to the muscles and nerves, and further, a histological treatment of embryology, such as has been attempted by Heichert, Vogt, and myself, will assuredly raise the veil, and bring it step by step nearer to the desired though perhaps never-to-be-reached end.

We refer here to some of the more important works and papers that have been published on this subject.

Köllicker, Manual of Human Histology; Sharpey, General Anatomy, in Quain's Elements of Anatomy; Beale, The Microscope and its Application to Clinical Medicine; Todd and Bowman, Physiology and Flora; Garber, Elements of the General Microscopic Anatomy of Man and the Mammalia; Goodrich, Anatomical and Pathological Observations; Hassell, Microscopic Anatomy; Bowman, On the Structure of Voluntary Muscles (Phil. Trans., 1840); Kiemun, On the Structure of the Lungs (Phil. Trans., 1830); Mundell, Manual d'Anatomie Générale; Moehl, On the Vegetable Cell; Owen, Lectures on Comparative Anatomy; Queckett, Lectures on Histology; Schiedel, Principals of Scientific Botany; Schiedel and Schwan, Microscopic Researches (Sydenham Society); Galton, Anatomia y Pathology; Robin, Histoire Naturelle des Vegetaux parasites; Carpenter, Principals of Physiology, General and Comparative, (Quarterly Journal of Microscopical Science.)

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HOLMAN, JAMES, known as 'The Blind Traveller,' was born in about the year 1876. He entered the royal navy in December 1876, and was appointed lieutenant in April 1887. At the age of twenty-five an illness which resulted from his professional duties deprived him entirely of his sight. On the 9th of September 1882, he was appointed one of the Naval Knights of the Légion of Honour. By degrees, when he had become accustomed to his condition, in 1819, partly the state of his health and partly a desire for change induced him to set out on a journey to the Continent, of which he published a description. On his return, he was taken in the Years 1819, 1820, 1821, through France, Italy, Savoy, Switzerland, parts of Germany bordering on the Rhine, Holland, and the Netherlands; comprising Incidents that occurred to the Author, who has long suffered under a total Deprivation of Sight; by James Holman, R.N. and K.W., 2 vols. 1822. On the 19th of July 1822, he embarked on a voyage to St. Petersburg, whence he proceeded to Moscow, Novgorod, and finally to Irkutsk, the capital of Eastern Siberia. His intention was to proceed through the steppes of Eastern Siberia, which becomes sufficiently flat to have crossed over, and travelled through Mongolia and China. At Irkutsk however an order was received by the Russian authorities from the Emperor Alexander, prohibiting him from proceeding any farther, and he was compelled to return. He was accompanied by a Russian officer to the frontiers of Germany, and was treated with external politeness combined with much harshness and severity. After his return to England he published 'Travels through Russia, Siberia, Poland, the Baltic States, Hanover, Prussia &c., 1823, 1824,' while suffering from total Blindness, and comprising an Account of the Author being conducted a State Prisoner from the Eastern Parts of Siberia, 2 vols. 1825.

HOLSWORTHY, [Devonshire.]

HONDURAS, Republic of, Central America, occupies the elevated country between the table-land of Guatamala and the plains of Mosquitoes and Nicaragua. It lies between 14° and 15° 30' C. long, and between 80° and 81° 30' W. long. Between Cape Eleonora and Cape Horn, but a narrow tract extends southward between Salvador and Nicaragua as far as the Gulf of Conchagua on the Pacific, 18° 30' N. lat. Honduras is bounded E. by the Mosquito territory, by the Rio Motagua, R., whose boundary line on this side remains undefined; S. by the river of Nicaragua, on a line where the narrow tract of land reaches down to the Gulf of Conchagua; W. by Guatemala; and N. by the Caribbean Sea. The area is about 30,000 square miles; the population is about 250,000, of which about 4,000 is black or mulatto. Surface. — The Caribbean coast from Cape Cameron to Cape Honduras bears, with a general concave sweep, due west, and thence to Caballo Point, and to the mouth of the Rio Motagua, a short distance east of which is the boundary between the republics of Honduras and Nicaragua. The northern coast is low; thence westward it is for the most part high and rocky. The only available ports are Truxillo at the mouth of the river of the same name, which is merely a small stream in the bottom of a large mulatto. Cape Honduras; and Omoa, a small but good harbour near the western extremity of the republic. The whole of this coast is extremely unhealthy, and consequently very thinly populated. The small tract owned by Honduras bordering on the Gulf of Conchagua, in the Pacific Ocean, is also low, subject to be inundated by spring tides, and very unhealthy; but in neither case does the miasmatic influence extend far inland.

The surface of the country is greatly broken. It may be described as a table-land traversed by several ridges of hills running from north-west to south-east with secondary ridges branching obliquely from them. The general level of the table-land is perhaps about 4000 feet; the highest part is probably in the southern coast. The shores of the Caribbean Sea a ridge of mountains, the Sierra Omos, extends from Cape Honduras to Caballo Point, near which is Mount Omoa,7000 feet high, which gives its name to the ridge. The culminating point of this ridge is the peak of Congress, 7th W. long, which is 8000 feet above the level of the sea. The ridges which traverse the interior of Honduras do not attain any great altitude above the general level. Between the ridges are long, wide, open and fertile valleys, which form a well defined and gradually broadening east. Near the western end of the state are the broad valleys of the Chamalico and the Uima, which are overgrown by thick forests of mahogany, cedar, and castic trees. Along the southern side of the territory runs a ridge which divides the waters which flow into the Pacific from those which fall into the Atlantic; but only a few peaks attain any considerable elevation. From this ridge, and from the transverse ridges north-west of it, a series of high and steep hills rise from a broad plain, and connect the table-land of Honduras with that of Guatemala. The valleys between these ridges are of comparatively moderate width.

The principal rivers flow into the Caribbean Sea. Beginning on the west we have the Chamalico, which rises on the Mereyendi, which flows from a broad plain generally northern direction into the Bay of Honduras a little east of Punto de Caballos. For a large part of its upper course it flows through a wild and uninhabited country; but as it approaches the sea the valley opens out to a great

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width, its slopes being covered with vast forests of valuable timber trees. Like most of the rivers of the state the navigation of the Chamacón is impeded by a bar at its mouth. East of the Chamacón is the Ulúa, a much longer and narrower stream. It is formed by the confluence of several branches, the longest of which rises not far from the borders of Salvador; it falls into the sea a short distance west of Punta de Sal after a course of about 300 miles, and forms the mouth of the longest navigable river of the continent. The next river of any size is the Truxillo, the mouth of which forms the harbour of the same name. East of this is the Ajan, which after a course of about 100 miles discharges itself by two branches into the Caribbean Sea, about 30 miles east of the mouth of the Ulúa. None of these are navigable for more than a short distance, and then only by piragua (a sort of river barge), except the Ulúa and Chamacón, which admit small schooners. The Choluteca, which falls into the Pacific at the entrance of Conchagua, a small stream draining a narrow valley, is the only river of the state which does not enter the Caribbean Sea. The roads throughout the republic are mere tracks worn by continual use.

**Climate, Soil, Productions.**—The climate, except along the coast, is on the whole salubrious, though the temperature is somewhat high. Guatire is common in the elevated districts. The valleys opening to the sea are very fertile, but moist and unwholesome. Those from which the air is intercepted by ranges of hills are less humid and more habitable. The rains fall in the hot season, in the north and in the districts not contiguous to the Caribbean Sea, the dry season begins about the close of October, and lasts until the end of May; during which time only a few showers occur. In the month of June thunder is frequent, and is followed by long and heavy rains.

The most important natural productions are the vast forests of mahogany, cedar, busti, pimento, and numerous other valuable trees. They are also productive of all the crops for the benefit of the roads, the scarcity of labour, and other local causes, they are turned to comparatively little account. From the same causes, and from the indisposition of the inhabitants to steady labour in the fields, agriculture is in a very backward state; not only are immense tracts of fertile land wholly neglected, but the land which is under cultivation is very far from being rendered as productive as it easily might be. Maize, rice, some wheat and barley, fríoles, plantains, and various fruits and vegetables are the most important articles, but scarcely in sufficient quantities for the requirements of the inhabitants. In the western districts of Gracias tobacco of very fine quality is raised, but not enough for exportation. The chief minerals are lead, silver, and iron. The latter are found in vast beds on the plains in the interior. Yet though such large numbers are maintained, they form but a limited article of export, and tallow and hides are only exported to a comparatively small amount. Sheep are not so numerous as in some of the other countries of Central America. Horses are not much attended to, nor are they of superior kinds. Mules are numerous, they being generally used in the country for the transport of goods.

The population is confined to the principal articles of home consumption. The commerce is but small; the foreign trade is chiefly carried on through Belize. As already indicated the exports are principally of mahogany, cedar, Brazil, and other cabinet and dyes-woods; sarsaparillas, bibles, and the products of the mines. The imports are British cottons, woolens, and hardwares, with various French, German, and American goods. Honduras is the principal mining country of Central America. The chief metals are lead, silver, and iron. The southern and western portions of the republic, but sometimes coasts, are productive of gold. Gold is found in veins in quartzose rocks; and in grains in alluvial deposits in the ravines, and in the sands of several of the rivers. Silver mines occur in several places in the department of Omo, and in the departments of Yoro, Santa Barbara, and Cortés, and in all the other departments, Copper is found of good quality in Choluteca and elsewhere. Lead and iron-ore are found in several places. Of the present annual products of the mines we have however no reliable statement. In Gracias occur veins of remarkably fine opals, as well as some yielding emeralds. Jasper, amesites, and chinchaca are likewise obtained. Excellent marble is wrought.

**Divisions, Towns, &c.**—Honduras is divided into seven departments: Comayagua, which occupies nearly the entire west coast, and maintains the head of the union; the north-west, and Santa Barbara to the north-west of Comayagua, both of which extend to Guatemala, and Santa Barbara includes the coast as far east as Punta de Sal; Yoro, which contains the district of the same name and extends from the mouth of the river of that name southeast to Cape Honduras, and contains the port-town of Truxillo; Tegucigalpa lies east of Comayagua, and is the chief mining district and most thickly inhabited department of the republic; on the north-east of it is the department of Choluteca, which contains the town of that name and the eastern districts; Comayagua is Choluteca, which stretches down to the Gulf of Conchagua, where is the little port-town of San Lorenzo, established a few years back in order to give the republic a port of entry on the Pacific. In the interior are several considerable towns; on the coast are only the small port-towns of Omo and Truxillo.

Comayagua (Valladolid de), the capital, is situated in a fine but unhealthy valley, at nearly an equal distance from the ports of Omo and Truxillo, in 14° 20' lat., 87° 30' west, and contains 5000 inhabitants. The public buildings are a cathedral, several churches, a college, an hospital, &c.

Topicalgapa contains from 8000 to 10,000 inhabitants, and is the most populous place in Honduras, being the chief town of the northern departments. The port of Tepic, or Truxillo, is a small place inhabited by a few ladinos, but is a good salt-warehouse, the harbour, which is formed by a small bay, is very good. The goods imported from Europe or America, are sent by barges to Guaná, on the banks of the Motagua.

The town is very unhealthy. The roads in the district of Tegucigalpa were constructed by the Spaniards in 1802. The Spaniards effected the subjugation of the country a few years later; from which time it remained a part of the Spanish kingdom of Guatemala until the declaration of independence by South America in 1824. Honduras was then comprised in the Mexican empire of Yucatán, on the dissolution of which in 1823, Honduras formed one of the federal states of Central America; but this union was also of short duration, and Honduras then became and has since continued to be an independent republican state.

(Jarros, History of Guatemala; Headkins, Central America; Baily, Central America, &c.)

**HONDURAS, BRITISH, or BELIZE,** a British settlement on the east coast of Central America, is bounded N. by Yucatan, W. by Vera Paz, S. by Guatemala, and E. by the Bay of Honduras and the Caribbean Sea. The settlement extends from 15° 54' to 15° 30' N. lat., and from 85° to 89° 30' W. long. The area is about 10,370 square miles, and the population, which consists chiefly of Caribs and negroes, is about 5000.

The surface is very irregular. In the interior it is greatly elevated, while the coast is for the most part low, and fringed with reefs and small islands, termed keys, which form the best harbours. The coast is frequently frequented by storms, and is watered by numerous rivers, the chief being the Belize, which is navigable for 150 miles from its mouth. The rocks are principally primary and calcareous. The easterly or seafires which prevail during nine months of the year, temper the heat, which however is scarcely ever excessive; the
The thermometer seldom rises above 80° Fahr. even in the hottest time, and during the wet season it sinks to 60°. In June, July, August, and September heavy and frequent rains fall, and these are the most unhealthy months of the year, disease being engendered by the marish使命感 arising from the levees and swamps. The soil by the coasts and rivers is a rich alluvial deposit, and very fertile. On the higher grounds are marly soils, sandy marly-soils, or magnesite-
nesses, and the logged-wood arboretum in the hills. Cedar and other valuable timber-woods are among the natural products. The plantain is extensively cultivated. Maize, rice, cassava, arrow-root, yams, &c. are grown. Cotton, maize, rice, cassava, &c. are grown. Of the birds that are nearly extinct, the woodcock, the black tiger, the black-cat, the leopards, and other wild animals, and game, are found. Turkeys abound on the shores.

British Honduras is governed by a Superintendent, and a Perpetual Court, consisting of seven magistrates appointed by its inhabitants. The superintendent is immediately subordinate to the Governor of Jamaica, from whom he holds his commission. He is assisted in the administration of government by an Executive Council consisting of the chief justices, the attorney-general, the officer commanding the land forces, and the public treasurer. An Act of the local legislature has however been passed by which the constitution of the council and assembly is proposed to be altogether remodelled. The raising of the capital, and indeed only town of any size, Belize, or Belmopan, under which it is more fully noticed, and where will also be found mentioned various other facts relating to the settlement. [Belize, or Belmopan.]

HOMESTONE. [MELIATA.]

HONEY-SUCKLE, FRENCH. [HEDYARUM.]

HONKENNEJA, a genus of Plants belonging to the natural order Coryophyllales, and the sub-order Alstroemeriaceae. It has 6 species, all large perennials, with ample, sessile, or very few, large seeds.

H. pedicellata in a British species found on sandy sea-coasts. It has ovate-acute sessile leaves,舟形, glabrous, and large flowers which are ovate, shorter than the petals, the style is closer, crenulate, or foliaceous; the flowers from the spines of the stem frequently deciduous; capsules large, globose; seeds few, large. [H. pedicellata.]

HOPPER, THOMAS, architect, was born at Rochester, in Kent, July 6th, 1776 or 1777, and, according to a family tradition, was descended from a natural daughter of Richard III. Thomas Hopper, when very young, was placed under his father, a stonemason and Surveyor, and it is supposed he very soon had the chief duty and responsibility of the business. Thus led to direct his attention to architecture, he became in some degree a self-taught architect; and when this time introduced to Mr. Waltham Porter, a friend of the Prince Regent, and of a sort of authority in matters of taste, Hopper was so fortunate as to please Porter, and was employed by him in extensive alterations and restorations to his house at Fulham, called Craven Cottage. His house became a remarkable specimen of the 'cottag

taste, and the art of the day—the character of which last has been sufficiently pointed out above—were suited to one another; and, favourably introduced, and possessing great energy, a work of conformation, and high spirit, it is not surprising that, at a time when there were fewer profess

ional architects than there are now, Thomas Hopper would have speedily entered upon a large practice. Amongst the buildings of all kinds which he was employed either executing or superintending, in Ireland, for the Marquis of Cowguy; Penkyn Castle, near Bangor, North Wales; Glastonbury, Arungh; Easton Lodge, Darrow, for Viscount Maynard; Leigh Park, near Spa, for Sir Thomas Leigh; St. John's House at Kimmeldale, for the Hon. Mr. Wylde; Ashpje, for Lord Dinoriv; the pleasure house at Salisbury; Danbury Palace, Essex; Gatton House, Surrey; Wyvyanooe House; Llanover Court, Monmouthshire, for Sir Benjamin Hall; Stansted Park, near Havant, Plants; Mar

..now you mentioned several different styles—the baronial castellated, then in favour, of being course amongst the numerous. Penkyn Castle is perhaps the best exemplification of the latter kind of taste, and is indeed in many respects impressive in effect, and may be safely said to have been almost entirely expended on it. He designed a baronial castle for the Duke of Atholl, at Dunkeld, in Scotland, which if completed would have rivaled Windsor Castle in extent, though the building never got beyond the foundations. He erected a similar structure for another baron, which afterwards he made alterations costing 40,000L. on its conversion for the cellular system. In London he was the architect of Arthur's Club House, in St. James's-street, the Legal and General Assurance Office in Fleet Street, and the Atlas Fire Office in Cheapside. His general manner for such buildings was derived from the class of edifices to which the Banqueting House, Whitehall, belonged. His last work, St. Mary's Hospital, Paddington, which is inferior in character, and splendidly but not expensively executed, was intended by him greatly and miasma

Honey-stone. [MELIATA.]

Honeysuckle, French. [HEDYARUM.]

Honkenneja, a genus of Plants belonging to the natural order Coryophyllales, and the sub-order Alstroemeriaceae. It has 6 species, large perennials, with ample, sessile, or very few, large seeds. H. pedicellata in a British species found on sandy sea-coasts. It has ovate-acute sessile leaves, boughy, glabrous, and large flowers which are ovate, shorter than the petals; the style is closer, crenulate, or foliaceous; the flowers proceed from the spines of the stem frequently deciduous; capsules large, globose; seeds few, large. [H. pedicellata.]

Hopper, Thomas, architect, was born at Rochester, in Kent, July 6th, 1776 or 1777, and, according to a family tradition, was descended from a natural daughter of Richard III. Thomas Hopper, when very young, was placed under his father, a stonemason and Surveyor, and it is supposed he very soon had the chief duty and responsibility of the business. Thus led to direct his attention to architecture, he became in some degree a self-taught architect; and when this time introduced to Mr. Waltham Porter, a friend of the Prince Regent, and of a sort of authority in matters of taste, Hopper was so fortunate as to please Porter, and was employed by him in extensive alterations and restorations to his house at Fulham, called Craven Cottage. His house became a remarkable specimen of the 'cottag
which may help to justify the position which we have given to his name.

HORHOUND. [Bellota ; Marrubium.]

HORNBLINDE, a Mineral belonging to the group of the Anhydrous Silicates of Magnesia. An account of its general characters and formation is given under Acorsa. It consists in general of crystals differing much in appearance, arising from isomorphism and crystallization. Alumina enters into the composition of some of them, and replaces part of the other ingredients.

The light coloured varieties belong to Tremolite or Grossulite. It comprises the white, greyish, and light-greenish slender crystallisations, usually in blades or long crystals, penetrating the gauze, or aggregated into coarse columnar forms; it is sometimes nearly translucent. The specific gravity is 2-93.

The light-green varieties are called Actinolite. Glassy Actinolite includes the bright glassy crystals of a rich green colour, usually long and slender, and penetrating the gauze like tremolite. Radiated Actinolite includes olivine-green masses, consisting of aggregations of coarse acicular fibres, radiating or diverging. Aedolostrom Actinolite resembles the radiated, but the fibres are more delicate. Massive Actinolite consists of masses of nodules and fibres. The specific gravity is 2-92 to 3-00. [Actinolite.]

Abestus is also included under this division. [Abestus.]

To the dark-coloured varieties belongs Pargasite, a term which is applied to dark-green crystals, short and stout, of a dark red loire, of which Parga in Finland is a notable locality.

The term Hornblende is applied to the black and greenish-black crystals and massive specimens. It contains a large per centage of oxide of iron, and to this it owes its dark coloration. It is a tough mineral. Pargasite and Hornblende both contain aluminous silicate.

The varieties of Hornblende fuse easily with some sulphur, the pale varieties forming a colourless glass, and the dark become more or less covered with iron. Hornblende is an essential constituent of certain rocks, as syenite, trap, and hornblende-slate.

Actinolite is usually found in magnesian rocks, as talc, asbestos, or serpentine. Tremolite occurs in granular lime-stones and dolomite; Actinos is occurs in the above rocks, and also in serpentine. [Data. Manual of Mineralogy.]

HORNBY. [Lancashire.]

HORNSEA. [Yorkshire.]

HORNBY. [Middlesex.]

HORSTONE. [Quartz.]

HOUGHTON-LE-SPRING. [Dorset.]

HOUNSWAY. [Middlesex.]

Plants belonging to the natural order Rhamnaceae. The peduncles of H. dulcis become extremely elongated and succulent, and are in China in much esteem as a fruit, resembling in flavour, it is said, a ripe pear.

Some parts are eaten raw.

HOWARD, HENRY, R.A., Professor of Painting in the Royal Academy, was born on the 31st of January 1769. He was a pupil of Philip Reinagle, R.A., and was admitted a student at the Royal Academy in March 1778. As a student his success was very decided; and it was his fortune, for the first time in the history of the institution, to receive on the same occasion, December 10th, 1790, two of the highest premiums—the first silver medal for the best drawing from the life, and the gold medal for the best historical painting; and he was at the same time appointed the silver medalist, or a silver medal of the president, Sir Joshua Reynolds, for the excellence of his historical design. In the following year he visited Italy, and at Rome he and Flaxman pursued their studies in conjunction.

On his return to England Mr. Howard was employed to make drawings for the Dilettanti Society, and designs for book-plates; he also painted some portraits. His first contributions to the Royal Academy, “These and Anchises” and the “Death of Euryalus” (1796), were much admired by persons of classic tastes; and from this time for more than half a century Mr. Howard continued, without a single intermission, to send to each annual exhibition some paintings almost invariably of the classes of which these works are examples. In fact the whole of his productions in that of a series of pictures which he executed, though illustrating themes from the Scriptures, and from Greek, Roman, Italian, and English history, poetry and mythology, have all or nearly all the same character, for which perhaps there is no word so descriptive as that of ‘academic.’ His figures are almost always well drawn; of elegant proportions; have the established ‘classical’ contour and expression, or absence of expression; are clothed, or partly clothed, in the same costume in which they appeared in ancient pictures, except when their position, wear so easily and gracefully in pictures and statues, despite the ordinary laws of gravity, which however may fairly be regarded as not applying to such beings; and they are almost always presented in an agreeable conformity to the rules of pictorial composition; while the colouring, if not rich and glowing, is chaste and harmonious. They were in fact good ‘academic’ pictures, and they are no more. Always strictly attentive to the correct proportions of the human form, and never rising in action, they often simulate, in a Venus rising from the Sea, ‘a Love animating the Statue of Pygmalion,’ or a cold ‘Primeval Hope,’ that can by any chance give the slightest shock to the nerves of the most susceptible—who is not shocked by the very mere mention of the word ‘undraped female beauty.’ But if his ‘beauties of fair forms’ are never like those of Eutyl trembling on the verge of the voluptuous, they never like them are buoyant with the exuberance of life and youthful vigour—never exhibit the tricks of the eye and the airiness of movement that move action. They are works to be looked at with a certain quiet admiration of the artist’s skill, not to seize the attention and linger in the memory. In a word, they are works of taste, not of genius.

Mr. Howard was elected an associate of the Royal Academy in 1801; in 1808 he became an academican; and in 1811 he was appointed secretary to the Academy, an office he held till his death, though for some years previously its active duties were performed by an assistant. He died on the 4th of October 1828, in the 80th year of his age.

The titles of a few of his pictures will sufficiently indicate the range and character of his subjects. Of his scriptural paintings, the most ambitious are “Christ blessing Little Children,” painted as an altarpiece in the chapel in Little Berwick Street; ‘the Angel appearing to St. Peter in Prison;’ and ‘Aaron staying the Plague.’ The great bulk of his pictures as already mentioned are however those in which the subjects were chosen with a view to afford the opportunity of painting the nude female form; and to this class his best pictures belong. The most admired of these is his ‘Birth of Venus,’ painted in 1829. Others are ‘The Marriage of Cupid and Psyche,’ ‘Prosperine,’ and like stock subjects; but a large number consists of figures floating in the air, as in the ‘Sleeping instants’ as the ‘Fidalgos,’ the ‘Solar System,’ the ‘Circling Hours,’ ‘Morning,’ ‘Night,’ &c. Besides numerous pictures from Spenser, his favourite poet, Milton, Shakespear (especially the ‘Midsommer Night’s Dream’), &c., he also painted the preparatory cartoons for the grand and fanciful subjects with which his name is connected; he also painted many portraits. It deserves to be mentioned as illustrative of his life-long devotion to his art, that not only did he continue to paint pictures for the Academy exhibitions up to the year of his death, but that on the occasion of the first cartoon competition, 1813, he did not shrink from entering the lists, though then seventy-three years of age, and in the rude encounter with the young artists fresh from the schools, his cartoon, ‘Man beset by Contending Passions,’ carried off one of the premiums of 100l. in 1814 Mr. Howard won the prize for a medal for the Patriotic Society, and thefortunately he was generally employed in preparing the designs for the medals and great medals for the Society, he was appointed as an artist to the Seamen’s Fund, and his designs for works to be executed in silver, chiefly for the homes of Rundle and Bridge. Frank Howard, the son of Mr. Howard, is well known as an able designer, and the author of several elementary works on art. To a brief memoir of his father contributed by him to the ‘Academy’ for November 13, 1847, we are indebted for most of the facts in this notice.

HOWLET. [Bramham.]

Hosia, a plant of the genus Hesperis belonging to the natural order Aoeapocadam. It has 6-leaf, rotative corolla. Crown of appendages depressed, 6-leaved; leaflets spreading, feathery, with the inner angle extended into a tooth lying upon the anther. Anthers terminated by a membrane. Pollen-masses are included in the anther. Stigma not parted, or scarcely so. Follicles smooth.

H. viridiflora is a native of Coromandel, Sylhet, and the
Hume, Joseph, was born at Montrose in the year 1777. His father was the master of a small coasting-vessel, and after his death his widow supported herself by keeping a shop in Montrose. Having received the merest rudiments of education, including Latin and a smattering of Greek, at school in his native town, he was apprenticed in his fourteenth year to a surgeon. In 1793 he entered the University of Edinburgh for the purpose of prosecuting his medical studies; and having taken a medical degree, and passed the London College of Surgeons, he was for some years in the employ of his father.

He distinguished himself not only in his medical capacity, but also by acting as pursuer on his voyages out, and conducting a most complicated business in a very successful manner. He was chosen as a fellow of the Royal Society of Edinburgh, in which capacity, which he declines, he is often called upon in colonial and municipal abuses, election expenses, the licensing systems, the duties on paper and printing, and on articles of household consumption. He took an active part in carrying Roman Catholic emancipation bills through the legislative chambers, and in the passing of the Reform Act of 1832. A remarkable passage in his life was his discovery, in 1835, of an extensive Orange plot, commencing before the accession of William IV. An account of this transaction, in all the minuteness of detail, will be found in Miss Harriet Martineau's 'History of the Thirty Years' Peace.'

The health of Mr. Hume began to break soon after the parliamentary session of 1834, and he died at Burnley Hall, his seat in Norfolk, on the 20th of February 1835. At the time of his death he was a representative of the county of Norfolk, in the house of commons, and a deputy lieutenant for the latter county. As a proof of the general esteem in which he was held, we may add, that in the House of Commons there is a picture of him by Mr. Philipon, engraved by Mr. Maguire, as his character. He married a daughter of the late Mr. Burnley, by whom he left a family of several sons and daughters. His eldest son is Mr. Joseph Burnley Hume, barrister-at-law.

Hymotopic Acid. [Chemistry, No. 1.]

Husband. [Divorce, No. 3; Separation, Journals, No. 2; Women, No. 2.]

Hyacinth. [Garden, No. 2.]

Hydrazine, a genus of Plants belonging to the natural order Cereales. H. globosa yields a fruit which is collected by the Cape Coloureds, and is sometimes used as a poison for hares by being rubbed over meat.

Hydra (Linnaeus), a genus of Polypiferous Animals, including the Fresh-Water Hydra, or Polyple. It has the following technical definition:—Polyple locomotive, single, naked, gelatinous, subcylindrical, but very contractile and mutable in form; the mouth encircled with a single series of granulous filiform tentacles.

As of all the forms of polypiferous animals the Hydra is the most interesting, and gives an abstract of their history, from Dr. Johnstone's 'British Zoophytes':—

Leeuwenhoek discovered the Hydra in 1703, and the uncommon way its young are produced; and an anonymous Englishman, Mr. Bouche, in 1760, described the true nature of the life of the Hydra in England about the same time, but it excited no particular notice until Trembley made known its wonderful properties about the year 1744. These were so contrary to established experience, and so foreign to every preconceived notion of animal life, that by many they were regarded as impossible fancies. Leading men of our learned societies were daily experimenting on the creature and transporting it by careful posts from one to another, while even ambasadors were forwarding to their respective courts early intelligence of the amazing accounts. The Hydra are found in fresh waters only. They prefer slowly-running or almost still water, and adhere to the leaves and stalks of submerged plants. The body is exceedingly contractile, and hence liable to many changes of form; when contracted into a sphere, a minute top most is seen; and when extended it becomes a long column, being ten or twelve times longer at one period than another, the tentacula changing in size and form with the body. On the point opposite the base, and in the centre of the tentacula, we observe a canal, or mouth, which leads into a wider cavity, excavated as it were in the middle of its body, and from which a narrow canal is continued down to the sucker. When contracted, and also when fully extended, the surface appears smooth and even; but in the intermediate stages it is alternately wrinkled and crenulated, an effect probably of a wrinkling of the skin. The tentacula encircle the mouth and radiate in a star-like fashion; but they seem to originate a little under the lip, for the body of the mouth is completely surrounded by them. They are cylindrical, linear, or very slightly tapered, hollow, and roughened, at short and regular intervals, with whorls of
tubercles, which under the microscope form a very beautiful and interesting object. The tentacles form a slender membranous tube, filled with an albuminous nearly fluid substance, intermixed with some oozing particles; and at certain definite places this substance swells out into tubercles or denser wartlike nodules, which are arranged in a spiral line. Every nodule is covered with a corolla of filaments, with a small cavity at the base, and with a very singularly constructed organ for catching the prey. The organ of touch consists of a fine sac, inclosing another with thicker parietes, and within this there is a small ball. From the point where the two sacs coalesce above there projects a long cilium, or capillary spine, which is non-retractable and apparently immovable. Surrounded by these cilia, and in the centre of the nodule, is placed the caput organ, called the ‘basta’; this consists of a long and slender sac, immersed in the nodule, and opening out at a small aperture even with the surface. At the bottom of the sac, and within it there is a sac-like vesicle, on whose upper depressed surface is seated a solid ovate corpuscle, which gives origin to and terminates in a calcareous sharp sagitta, or arrow, that can be pushed out at pleasure, or withdrawn, till its point is brought within the sac. When the Hydra wishes to seize an animal, the sagittae are protruded, by which means the surface of the tentaculum is roughened, and the prey more readily held. The cilia become quite at the same time injected—a conjecture offered to explain the remarkable fact of the almost instant death of the prey. The tentacles of the tentaculum are connected together by means of fine transverse fibres, named cords, which, when arranged, the body of the Hydra becomes a viscid, formless, and somewhat papery mass of organ in the form of a portion of a sphere. The cephalic extremity is a viscid, and forms the mouth, the circular aperture of which is lined with a viscid, and forms the mouth, the circular aperture of which is lined with a viscid, becoming in all respects as in size similar to the parent. It remains attached for some time, and grows and feeds, and contracts and expands after the fashion of its parent, until it is at length thrown off by a process of exfoliation or sloughing. They develop with great rapidity in warm weather, and sometimes the young ones themselves breed others, and they again a third or fourth generation before they become separated from the original parent. This generation is much faster, and the young ones, when the parent is a forty-five year-young ones in two months. In autumn the Hydra generates by internal osmotic gymnastics, which extrude from the body, and lie during the winter in a quiescent state, and are stimulated to evolution only by the return of the warm weather. They increase in numbers in these ova, so that their structure, source, manner of escape, and condition, are scarcely known.

These are the modes in which the Hydra naturally multiplies its kind, but it can be increased by artificial means of the body in the same manner that a perennial plant can by shoots or slips. If the body be halved in any direction each half in a short time grows to a perfect Hydra; if it is cut into four or eight or even miniced into forty pieces, each piece, if well treated, will develop into a complete Hydra; it is itself capable of being multiplied in the same extraordinary manner. If the section is made lengthwise so as to divide the body into two or more slips connected merely by the tail, they are quickly reunited into a perfect whole, or if the pieces are kept under each will become a perfect poly. If the tentacles are cut away, new ones are quickly produced, and the lost-off parts are not long without a new body. When a piece is cut out of the body the wound quickly heals, and in a day or two there is the polyp sprout from the wound more abundantly; when a polyp is introduced by the tail into another body, the two unite and form one individual, and when a head is lost off, it may safely be replaced on the body of any other individual, one. And this polyp is capable of bringing itself by all these apparently cruel operations; for before the lapse of many minutes the upper half of a cross section will expand its tentacles and catch prey as usual, and the two portions of a longitudinal division will after a time take food and retain it. A polyp cut transversely is three parts requires four or five days in summer and longer in cold weather for the middle pieces to produce a head and a tail, and the tail part to get a body and head, which they do in pretty much the same time. And what is still more extraordinary, polyps produced in this manner grew much larger and are far more prolific in the way of their natural increase than those which were never cut. When such things had been announced, when a little worm was the first animal body are found to be capable of artificial generation, and the whole of affections of antiquity realied, it is not wonderful that the vulgar disbelieved when naturallists, familiar with all the miracles of the insect world, were amazed and wist not what to do.

The following are British species of this animal —

*H. viridis* (Polypus Verus of Trembley), is of a green colour.

The body cylindric or insensibly narrowed downwards; tentacles 6 to 10, shorter than the body. It is commonly found in ponds and still waters. The polyps of this species differ from the following only in beingöklikwise in their arms, which are much shorter in proportion to their bodies, capable of but little extension, and narrower at the root than the extremity, which is contrary to the other species; the arms are always green. They have both a very small and slender worm, but seemed to suck it fast till they could master and devour it, which they did
HYD

as with much greediness as any. It was first observed in
Essex in the spring of 1743 by a Mr. Ducane of
Essex. It appears to be a hairy animal, and is easily kept for
a length of time in a phial of water.

H. vulgaris is of an orange-brown or yellowish colour,
body cylindrical, tentacels 7 to 12, as long or longer than
the body. It is found in weedy pools and slowly-running
tidal streams. This does not exceed H. varius in size, which it
resembles also in its habits and form. It is always of an
orange-brown or red colour, the intensity of the tint depend-
ing on the nature of the food, or the state of the creature's
mood. Every part of the body is generative of young,
which may be seen in the female parent at the same
time in different stages of their growth.
H. attenutata is of a light oil-green colour, the body at-
tended below, with pale tentacels longer than itself. It is
found in ponds, and in Yetholm Leugh, Roxburghshire.
This is a species of H. varius, and is rare, but less
notable for external impressions, and of a more
gaudy form. Its colour is a pale olive-green, with paler
streaks, which are considerably longer than the body,
and hang like silken threads in the water, waving to and fro
without assuming that regular circular disposition which
they commonly do in H. varius. Dr. Johnson says he has
not observed more than one young at a time, which pulalitized
from near the middle of the body, and after this has attained
a certain growth, its body, the polyp has the appearance of being
dichotomously divided.

H. oligactis (Polyopes à Long Bras of Trembley) is brown
or griseous; inferior half of body suddenly attenuated;
tails or tentacels are longer than the body. It is found in
still waters in England, rare. In a pond at Hackney, and in
a pond at Crammore, near Belfast, September 1812. The
tails of these are long, slender, and transparent, and when
placed under the microscope a long straight canal may be
seen passing from the body or stomach to an opening at the
end thereof; these are rather lighter coloured than H. vul-
garis, and have seldom more than 6 or 8 arms, those
of great extent. It may be worth while to call attention to the
remarkable resemblance of the Hydra fusco
the Oceanicae cirrata of Müller, which is an intestinal
worm.

(Johnston, History of British Zoophytes; Landborn, Popular History of British Zoophytes; Trembley, Memoires pour servir à l'Histoire d'un Genre de Polyoses d'aujourd'hui, the Hage, 1743; Baker, Natural History of the Polyope.)

HYDRIDE, a family of Snakes belonging to the Cen-
tryside sub-order of Dr. J. E. Gray's arrangement, and the
first section of this sub-order, which includes the Hydrides
and Boa. The latter is thus characterized: with
narrow elongate shields or scales, nearly resembling
those of the snakes.
The following is a synopsis of the genera, and a list of the species. Compiled from the Catalogue of the species of Snakes in the British Museum:

Hyrida.—The ventral shields narrow, hexagonal or
band-like; the hinder lips not developed; the eyes and
nostrils superior, vertical, the latter valvular, generally
placed in the middle of a shield, with a slit or groove to its
outer edge; fangs moderate, intermixed with the maxillary
teeth; papill small, round; tail compressed or conical. They
live in the sea or salt-water lakes, or in fresh water.

Synopsis of the Genera.

1. Tails compressed (except in Acharondr.). Belly keeled,
with two rows of small scale-like shields, often united
in a single, rather broad, 6-sided shield.

4. Head shielded to the nape. Nasal shields very large,
with a large, opacified, superior nostril in their hinder
division; frontal shields two pairs, small; loreal
shield none; labial shields, large, high. Hydrina.

These are the true Sea-Snakes. They coil themselves up
on the shore, and appear to live on sea-weed, and lay their
eggs on the shore. They are often found asleep on the
surface of the sea, where they are easily caught, for they
cannot escape the spilling of the seas, or the spouting
of waves to their backs. This arises apparently from the necessity of
spilling the air from their large lungs. They are often
thrown shoreward in the surf, and are occasionally carried
upstream by the tide, but they cannot live in fresh water.
Their bite is venomous, and they are held in great dread by
fishermen wherever they occur, on this account. In spite of

their venomous properties, one species at least, the Hydrina
(Pelamis) bicolor is said by Cuvier to be eaten at Tahiti.

a. Scales square or 6-sided, placed side by side.
   Head elongate, depressed.

1. Pelamis.
   P. bicolor. Pacific Ocean. For figure see Hryna.
   P. ornata. Borneo.

2. Lopeus.—Head moderate, short, rounded in front;
dorsal scales square; ventral shield broad, 6-sided.
   L. Hardwickii. Borneo.

3. Aturia.—Head moderate, short, rounded in front;
dorsal scales 6-sided; ventral shield 6-sided.
   A. ornata. Indian Seas.
   A. Belcheri. New Guineas.

4. Microcoelophis.—Head small; scales 6-sided; ventral
scales keeled.
   M. gracilis, the Kadal Nagam. Madras.

δ Scales ovate, 6-sided, imbricate, keeled, or with the keel
reduced to a tubercle on the centre of the scales; head
and gape moderate.

   Lateral shields occupying the greater part of the
     lip; the eyes over the fourth, or rarely over the
     third, or the fourth or fifth shield; ventral shield
     united.

5. Enhydrina.—Rostral plates narrow, erect; lower
linear; sunken, nasal rowed in front; ventral shield flat;
head moderate, short; eyes moderate.
   E. Bengalensis. Madras.
   E. Volakadjen. Madras.

6. Hydrophis.—Rostral broad, transverse; lower trian-
gular; nasal truncate or notched in front; ventral shield
flat; head short; eyes small.
   H. obscura, the Shooter Sea. Madras.

7. Chitulia.—Rostral broad, transverse; lower triangular;
   nasal truncate or notched in front; ventral shields flat;
   head elongate, depressed.
   C. tenuorita. Indian Ocean.
   C. fasciata. Indian Ocean.

8. Kerila.—Rostral broad, transverse; lower triangular;
   nasal truncated or notched in front; ventral shield broad,
   convex, forming a slight keeled ridge; the hinder ones with a
   keel on each side; head short, shelving; scales very large,
   broad, 6-sided; eyes rather large, over third and fourth
   labial shields.
   K. Jerdoni, the Kerilia. Madras.

   K. Sherali, the Kerilia. Madras.

   ** Lateral shield occupying the front half of the lip; eyes
   over the fifth or sixth shield; hinder part of the face
   covered with small scales; ventral scales generally
   6-rowed, forming a keeled ridge, some united in pairs
   in 6-sided scales.

   H. major, the Sea-Snake. India; Australia.
   H. annulatus, the Ringed Sea-Snake. Singapore.

   c. Body covered with smooth polished imbricate scales;
   head large as the body; ventral shields rather large, trans-
   verse, smooth, united to the keel, and large and broad.

10. Tomaspater.—Head with regular shields; supernumerary
   shields simple; ventral shields entire.
   T. Eydousi. Indian Ocean.

11. Stephanohydra.—Head shields numerous; supernumerary
   shields 3 or 4; ventral shields nicked behind.
S. fusca, Jukas's Hypotrophis. Darnley Islands.

B. Head covered with scales, like the body; nostrils surrounded by a small, continuous ring; eyes surrounded by a series of small scales; labial shields small, with a larger series above them; pupil round; ventral shields very small, scale-like, separated on each side of a keeled ridge. The species are all inhabitants of rivers.

Acrochordina.

12. Cherthydrus.—Tail compressed, sword-shaped, prehensile; body fusiform, covered with small rhombic scales, with a central tubercular keel.

C. granulatus, the Cherthydrus, Madras. For figure see Hydrops.

C. annulatus. Madras.

13. Acrochordina.—Tail conical, tapering, moderate; body fusiform, covered with tricuspid scales.

A. Jianaxia. Java.

II. Tail conical, tapering. Belly rounded beneath, with more or less broad band-like shields. Rivers or ponds.

A. Head shielded; tail scaly beneath; abdominal shields flat, small, 6-sided, with a keel on each side, as if formed of two united scales; nostrils in a ring of small scales; scales keeled. Erpetonsina.

E. tentaculatus, the Erpeton. [Eenroaw.]

B. Head shielded; tail with two series of shields beneath; nostrils between two shields; abdominal shields broad, keeled on each side; scales smooth. Bikiana.


B. hydroides.

C. Head shielded; scales striated, and keeled or smooth; tail conical, tapering, with two series of shields beneath; nostrils in centre of a large nasal shield, with a groove to the outer side; ventral shields rounded (or rarely slightly keeled on the sides): frontal shields 3, rarely 2 or 4, all small. Cerberina.

a. Crown scaly; occipital rudimentary; frontals 4; anterior pair very small.


C. inauris, the Baroe Bokadam. India.

C. acutus. Borneo.

C. unicolor. Philippines.

C. musculus. Australia.

b. Crown shielded; occipital moderate.

* Head distinct, depressed; frontals 4; anterior pair small; rostral rounded.

17. Feraria.—Scales smooth; seventh upper labial low, with a large shield over it.

F. Siewoldi. Bengal.

** Head distinct, depressed; frontals 3; anterior transverse; rostral rounded.

† Fourth and fifth hinder labial shields small or divided.


H. bicuspis. Java.

H. Hordivitis. India.


P. punctata. India.

+++ Hinder labial large, like others; scales keeled; rostral rounded.

20. Uranops.—Scales truncated, strongly keeled, striated; eye over fourth shield.

U. angulatus. Tropical America.

21. Tachynectes.—Scales truncated, strongly keeled.

T. Leoparctina.

22. Tropidophis.—Scales ovate, keeled, striated; eye over fourth and fifth shield.

T. Schistoma, the Chittee. Ceylon.

23. Myron.—Scales ovate, slightly keeled, smooth.

M. Richardsoni. Australia.

M. trinitatis. India.

24. Helicops.—Scales ovate, polished; of back and tail keeled.


+++ Hinder labial large, like others; scales smooth; rostral rounded.

25. Hypotisina.—Seventh labial large; eye over fourth and fifth labial; loreal distinct.

H. plumbea. Borneo.

H. Hardivitis. Penang.

H. Aer, the Ulak Aer. Borneo.

H. bilunata. China.


H. Bennettia. China.

26. Farancia.—The seventh labial large; eye over the third and fourth labial.

F. fasciata, the Wampan-Snake. New Orleans.

27. Hydro.—The seventh labial large; eye over the fourth labial; ventral shield broad; body thick; loreal none.

H. Mariti. Brazil.

28. Hygrina.—The seventh labial large; eyes over the fourth labial; ventral shield narrow; body slender; loreal none.

H. fasciata. Demerrara.

29. Dimodes.—The seventh labial short, small; eye over third and fourth labial; loreal none.

D. piciculitis. New Orleans; North America.

+++ Head moderate, depressed; frontal 3; anterior elongate erect, between the nasals; seventh smooth; rostral rounded.

30. Furudonia.—Scales broad, rhombic; ventral shield rounded; loreal none; eye over third labial.

F. leucohyla. Timor.

F. unicolor. Borneo.

31. Gerarda.—Scales broad, rhombic; ventral shields rounded; eye over fourth labial; loreal square.

G. bicolor, the Gerard. West Indies.

32. Hippotes.—Scales narrow, flattened; ventral shields keeled at each end; loreal square.

H. fasciata. West Indies.

+++ Head indistinct; frontal 4; anterior 4-sided, rather smaller; scales smooth; body cylindrical.

33. Abatdr.—Body cylindrical; loreal shield none; anterior frontal 4-sided; posterior ocular 2.

A. erythrogena, the Striped-Wampum. North America.

34. Radixia.—Head small, conical; body subcyindrical; anterior frontal very small, triangular; loreal distinct; posterior ocular.

R. Indica. India.

35. Mariosia.—Head small, conical; body compressed; frontal plates 2 pairs; loreal none; posterior ocular 2.

M. alatons. Java.

+++ Head moderate, depressed; frontal shields, 2, small lateral; rostral shield angular, high, erect, between frontal and nasal.

36. Fleiaxia.—Head small; rostral plate large, produced between the frontal, angular and recurved in front.

F. olivacea. Mexico.

+++ Head small; frontal shields 2, transverse, band-like; rostral triangular, subangular.

37. Proptoma.

P. naeoaria. Guinea.

D. Head covered with small scales; tail with one row of shields beneath; abdominal shield broad, rounded, smooth; nostril in a shield, anterior, sublateral; scales granular, with rows of keeled scales. Xenedermis.

38. Xenedermis. J. Xanonicis, the Genionote. Java.

Dr. Gray says, "The separation of the specimens of this family into species and genera is attended with great difficulty; the form and number of the shields of the head, lips, temple, and chin are liable to great variation, not only in the
different specimens, but often in the two sides of the same individual. The two ventral series of scales are, in the same specimen, sometimes separate, and at other times united into a shield; and many specimens have a series of small triangular shields on the edge of the lips, between the stipes of the lip-shield, not found in other individuals of the same species.

* The distribution of the organs on the body appears to be one of the permanent characters of the species; but this becomes less distinct in the older specimens, and is often lost in the specimens that have been carelessly or long preserved in a museum. The existence of this family of Water-Snakes has undoubtedly given rise to the notion that a large Ophiad, which meets the popular view of a Great Sea-Serpent, exists. In all cases however the reports of the existence of such a creature have been traced to the capture or sight of some other animal, or to the exaggerated representations of some other natural object. The Hydroidae amongst the Hydroidea are of comparatively small size, seldom equalling the Boidae in this respect, and falling far short of the enormous dimensions popularly attributed to the Great Sea-Serpent.

** HYDROIDEA. ** [Mineralogy, S. I.]

HYDROCYON, a genus given to Fishes belonging to the Malacopterygi Abdominatae. The species are very numerous. They have the point of the muzzle formed by the inter-vallii, the maxillaries upper, before the eyes, and completing the upper lip. The tongue and vomer smooth, the jaws with conical teeth, and the large suborbital covers the cheek like an operculum. A large number of species inhabit Brazil. They are also found in the Nile.

** HYDROIDA. **

A name given to a section of the order Polyphora, embracing forms resembling the fresh-water Hydra in the simplicity of their organisation. The following is Dr. Johnston's arrangement of the families of British Polyphora referred to the Hydroidea:

1. *Ovira* or bulbules naked, land-like, pollinating from the stipes of the tentacles.

2. *Tubularia*, Ehrenberg (Tubularia, Linnaeus; Tubularia, Linnese; Tubularia, Johnstone; Leu Tubularia, Van Baeended).

3. Family I.—Polytrk naked, or only with a rudimentary polypid: Corynaea.

+++ Polytrk naked.

The tentacular scattered. *Ovira.*

The tentacular in one row. *Hydactilina.*

+++ Polyp with a horny cuticle.

The tentacular with globose tips. *Coryne.*

The tentacular filiform. *Coryphora.*


+++ The tentacular in a single row. *Exudinrnum.*

+++ The tentacular in a double row.

Polyplid rooted. *Tubularia.*

Polyplid unrooted and deciduous. *Corynora.*

** Ovira in the form of horny capsules or vesicles scattered on the polypid, and deciduous.


Family III.—Cells of the polyp sessile. *Sertularidae.*

+++ Cells biseria.

Cells alternate, tubular. *Haliclum.*

Cells vasiform, everted. *Sertularia.*

Cells comico-tubular, appressed. *Thiaaria.*

+++ Cells uniseria.

The branchiata plumose or pectinate. *Pumilulata.*

The branchiata whorled. *Antennulata.*


Cells alternate, campanulate. *Laomedea.*

Cells irregular, or whorled. *Campanulata.*

+++ Polypid propagating by buds and ova, which develop themselves on and in the body of the parent.

** HYDRA. **

Ehrenberg (Hydra, Linnaeus; Hydrara, Johnstone). One genus only. *Hydra.*
valves of the involucres are convex or gibbose throughout, touching only by their edges, which are quite entire. The range of this species seems to be much more extensive than that of its congeners, and it appears to be a taurus species and northern species, and generally to prefer a greater elevation; still the two plants are often intermixed, particularly about the waterfalls in the vicinity of Killarney, and it is very frequently difficult to distinguish the one from the other.

(N. S. & E. F. V.)

HYOSCIA MA. [CHEMISTRY, S. 1.]

HYPERURIC ACID. [CHEMISTRY, S. 2.]

HYPOXIDACE.E. Hypoxis, a natural order of Endogenous, Herbaeous Plants, with tumbous or fibrous perennial root. Leaves always growing from the root and crown, nowhere else, linear entire, plaited, of a dry texture, Scapes simple or branched, occasionally very short. Flown complete, hermaphrodite. Perianth petaloid, adherent to the ovary, 6-parted, with the sepals conser than the petals. Stamens are inserted into the base of the segments of the perianth; filaments distinct; anthers turned inward, 6-celled, erect, opening lengthwise. The number of the plants of this order is very inconsiderable. Those that are known inhabit the Cape of Good Hope, Australia, the East Indies, the tropics of America, and the warmer parts of the United States.

The roots of Curculigo orchoides are somewhat bitter and aromatic, and are employed medicinally in India. The tubers of C. stoechad are eaten in the Marianne islands; those of Hypoxis roscia are employed by the aborigines of North America in healing ulcers and against intermitting.

I

IBALIA. [Galanthum.]

IBRAIL, IBRAILow, or BRAYLOW, a large town in Wallachia, is situated on the left bank of the Danube, 15 miles S. from Galatz, 103 miles N.E. from Bucharest, and has about 20,000 inhabitants. It stands nearly opposite the Turkish fortress of Matchin, and is the chief shipping port of Wallachia, whence the corn and other products of that principality are exported. The town has of late years risen rapidly in extent and importance. Its population in 1836 was estimated at only 6000. The harbour, formed by an arm of the Danube, is sheltered by an island. There are extensive granaries and warehouses in the town. Between 600 and 700 vessels enter and leave the harbour annually. Many of the inhabitants are engaged in the sturgeon fisheries of the Danube. In the wars between the Turks and Russians in the 18th century, the town was more than once besieged and taken by the Russians, who burnt it in 1770. After the peace of Kutchuck-Kainardji in 1774, the town was strongly fortified in the European manner; but the Russians took it again in 1826, and demolished its defences. It was restored to Turkey by the treaty of Adrianople.

ICARIAN SEA. [Zugan Sea.]

ICTERIA. [Marulida.]

ICTINIA. [Falcondium.]

ILAX. [Laxmidea.]

IDRIALE. [Chemistry, S. 2.]

IERAX. [Falcondium.]

IGNATIA, a genus of Plants belonging to the natural order of Balsaminae. One of the species of this genus, I. amara, yields the St. Ignatius's Balsam, under the name of Papeeta, they are said to be a remedy for cholera. No proof has been afforded of their efficacy in this disease, and Dr. Lindey ('Vegetable Medicine') says that convulsions and giddiness are known to follow their exhibition when given in an over-dose.

ILICIN. [Chemistry, S. 1.]

ILKESTEN. [Derbyshire.]

ILM0NTER. [Somersetshire.]

ILSEY, EAST. [Hereford.]

IMPERATORIN. [Chemistry, S. 1.]

IMPROVEMENTS, PUBLIC. [Public Improvements.]

INDIAN EMPIRE. The British Empire in India now extends from the Indus on the west to the Tenasserim Provinces and the Eastern India Settlements on the east, and from the Himalaya Mountains and the frontiers of Nepal on the north to Cape Comorin on the south. Under the head Hindostan an ample description has been given of the whole of that great peninsula, including the Punjab, Goojerat, and the island of Cutch. India is described separately [Singh, S. 1.], as also are the Tenasserim Provinces [Tenasserim], and the Eastern Straits Settlements [Malacca; Penang; Singapore; &c.].

The administration of British India is now under the Governor General of British India in Council (who is Governor of the Presidency of Bengal), the Lieutenant-Governor of Bengal, the Lieutenant-Governor of the North-Western Provinces, the Governor of the Presidency of Madras, and the Governor of the Presidency of Bombay. A Return furnished by the East India Company, and presented to the House of Com-
We shall now add the additional historical details down to the present time (March, 1850), in the form of a chronological account, arranged under each of the successive years.

1847.


1848.

April 30. Mr. Vans Agnew and Lieut. Anderson, with a small body of troops, arrived in the city of Moollan on the 1st of April, accompanied by the newly appointed governor-general, Lord Napier. Lieut. Anderson was murdered on the following day, by order of Moolraj, the ex-governor, who immediately began preparations for a war with the British. Lieut. Edwards, who was then on the west bank of the Indus, hastened to join the army with another force. Edwards met the retreating defeated army, till they descended by the western bank of the Indus, while 10,000 troops sent by Moolraj descended by the eastern bank. Edwards crossed the Indus with 3,000 irregular troops and about 800 cavalry, but not artillery, in order to make a junction with the army of the Nawab of Behulpur, leaving Cortalnd to procure boats and bring over the rest of the troops and guns. Before this could be done, the troops of the Nawab were defeated, and Edwards, with his small body of men, was attacked by Moollan's force of 10,000 men and 100 guns. Edwards defeated the retreating defeated army, till at length Cortalnd got over gun after gun, and gradual reinforcements of men. The Sikh forces were then defeated, and fled to the city of Moollan. This was the last battle of which it is necessary to speak. July. Lieut. Edwards and the Nawab of Behulpurpoor invaded the city of Moollan.

August 15. General Whish arrives with additional troops before Moollan, and a bombardment is commenced on the 18th of September.

September 22. General Whish, in consequence of the defection of SherSing with 6,000 troops and a quantity of artillery, is obliged to raise the siege, and take up a position in the vicinity, waiting for reinforcements.

Several various movements by the Sikh forces under SherSing and Chutter Sing, and the British under General Gough and Major-General Thackwell. The Sikhs are driven from an advantageous position at Ramban, by Thackwell, November 2, who again defeats them, December 3, below Vizierabad. December 27. Reinforcements having arrived, the entrenchments of Moollan are again attacked.

1850.


January 18. Battle of Chillianwallah, between the forces under Sir Hugh Googhe and the Sikhs. In this battle Sir H. Googhe attacked precipitately; and though the enemy suffered great loss and retired, the loss of the British was 537, and that of the Sikhs 7,307, and Chatter Sing with a large force of insurgents from Attock. Sir H. Googhe, in his dispatch, said the victory was complete; but the Duke of Wellington and the British government thought otherwise. At this time Sir Charles Napier was appointed to supersede Sir Hugh Googhe as commander-in-chief. January 29. Practicable breaches having been made in the citadel of Moollan, and preparations made for storming, Moolraj surrendered himself and the garrison unconditionally. January 14 to 16 February. After the battle of Chillianwallah there were several movements of the Sikh forces and the British.

February 17. General Whish crosses the Chenab, and, with his forces in communication with those of General Gough.

February 21. Battle of Goojerat. By this battle the brave old Gough retrieved his character and won additional fame. The Sikhs under ObstunSingh and Shere Singh were strongly posted on the village of Goojerat, with 80,000 men and 60 pieces of artillery. The British force was 34,000 men and 97 pieces of artillery. The battle lasted from six o'clock in the morning till five in the afternoon, when the Sikhs were attacked. In the night, the British camp was taken, and the work of some artillery was immediately commenced. They were poured fifteen miles. The two leaders escaped with about 6,000 men into the Salt Range Hills. The final result was that 23 of their guns and all their ammunition were captured.

March 14. Chutter Sing, Shere Singh, and the principal chiefs of the Sikhs, together with 15,000 men of the Sikh army, surrendered, with all their arms and 41 guns, to Major-General Gilbert, at Rawul Pundee.

March 29. Proclamation by the governor-general, announcing the annexation of the Punjab to the British possessions in India. Duleep Singh, the deposed Malah-Raja of Lahore, retires to Poona, on a pension of 40,000l. a year.

May 6. Sir Charles Napier arrives at Calcutta as Commander-in-Chief.

September. Moolraj having been condemned to death in August, for the murder of Agnew and Anderson, is sentenced to transportation for life.

1850.

February 27. Sir Charles Napier, by a general order, disperses the 66th Bengal Native Infantry, for mutiny.


July 2. Sir Charles Napier resigns his office of Commander-in-Chief, and arrives in London, March 19, 1851.

1851.

January 28. Death of Bajee Rao, ex-Peshaw of the Mohrattas, at Bithoor. He enjoyed, by treaties, June 13, 1817, and June 1, 1816, a pension of eight lacs of rupees (90,000l.), a year. Greenwatt Nursee Punk, Nana Sahib, eldest son of Bajee Rao, is domiciled by his uncle as his heir, and on the death of Bajee Rao, claimed the continuance of the pension, which was refused by the Supreme Government of India, and the refusal was confirmed by the Court of Directors.

September 1. Prince of Wales Island, Singapore, and Malacca, formed into a separate government, independent of the Supreme Government of Bengal.

October 29. A British naval force arrives before Rangoon, in consequence of disputes between the government authorities of the Burman Empire and the Supreme Government of India.

1852.

January 4. The victory of Rangoon erects stockades and batteries, to prevent the British vessels from communicating with the shore or leaving the harbour. The British com- modore destroys the batteries, and forces the passage of the river Irrawady.

February 6. Marathas stormed by the troops sent from Hindustan.

April 14. Rangoon stormed and captured by General Goodwin.


October 9. Prome recaptured.


December 3. Pegu invested by a Burmese army. A British force of 4,400 men sent from Rangoon destroys the besiegers, which relieves the siege.

December 30. A proclamation of the Governor-General of India annexes the province of Pegu, which formed a part of the Burman empire, to the British possessions in India.

June 20. Proclamation by the Governor-General of India announcing the termination of the war with Birma.

The Charter of the East India Company, granted in 1833, being to terminate in April, 1854, an Act was passed, August 30, 1853, "to provide for the government of India." The following is the substance of the most important clauses:

August 30. Act 16 & 17 Vict. c. 95. 1. Until Parliament shall otherwise provide, the British territories in India are continued under the government of the East India Company. 2. After April 1854 there are to be only fifteen directors of the said Company, any ten of whom are to form a Council. 3. The Crown is to appoint six of the directors. 9. Six of the twelve elected directors must have resided at least ten years in India to provide for the government of India.

December 11. Death of the Raja of Nagaop, whose territories were then added to the British possessions in India.

May 31. Treaty with Dost Mahomed, who is afterwards re-instated on the throne of Cabul.

February 7. The Governor-General announces by a proclamation the deposition of the king of Oude, and the
annexation of the kingdom of Oude to the British possessions in India. The King of Oude is granted an annual pension of twelve lacs (120,000L.).


For a notice of the dispute between the British and Chinese authorities at Canton, see China, S. & S.

1857.

The year 1857 is sadly distinguished by the mutiny of the native regiments in India. In January, February, March, and April, there were mutinies of single regiments at Barrackpore, Berampore, and Lucknow, which were suppressed; but on the 10th of May the 3rd regiment of Bengal cavalry broke out into open mutiny at Meerut, and was joined by the 11th and 30th regiments of infantry. The mutiny spreading, the authorities of England, General Canning, on the 21st of May, orders the evacuation of Delhi, and the British forces retire to the Residency at Lucknow. On the 22nd, the British forces had entire possession of the city of Delhi.

September 25. General Havelock, accompanied by General Outram, with 3,000 troops, arrives at Lucknow and relieved the Europeans besieged in the Residency, but is unable to force the gates of Delhi.

October 27. Sir Colin Campbell, having been appointed Commander-in-Chief, leaves Calcutta on his route to Cawnpore.

November 3. Sir Colin Campbell arrives at Cawnpore. November 13. Sir Colin Campbell, with about 15,000 troops, commences the attack on the rebels at Lucknow.

November 17. Sir Colin Campbell, after a series of operations and some severe fighting, forces his way into the Residency at Lucknow.

Sir Colin Campbell, having remained two or three days, evacuates the Residency at Lucknow, and by a well-directed feint, brings about the whole of the besieged garrison, with all the sick, the women, and children, without the loss of an inch of ground, to a point where the whole are placed in the hands of Alumbagh, about three miles from Lucknow.


December 7, 8. The Gwalior contingent force having surrendered, under General Seals and the nominal possession of the town, Sir Colin Campbell attacks the Gwalior mutineers, and defeats them.

December 10. The defeated Gwalior troops are pursed by General Hope Grant, with cavalry and infantry, and are completely dispersed, with the loss of the remainder of their guns and all their baggage, stores, and ammunition.

1858.

In the early part of this year various bodies of mutineers are found at different places. In the mean time Sir Colin Campbell at Fathelugar and Cawnpore, having collected troops to the amount of about 20,000 and about 130 heavy guns, commences the siege of Lucknow on the 1st of March. In connection with the troops of Sir James Outram and other officers, altogether, it is stated, amounting to about 50,000 men.

The last mail from Bombay states that the old King of Delhi has been tried, found guilty, and condemned to behead-ment.

Lord Palmerston's late government announced the intention to bring a hill into parliament, for the purpose of transferring the government of British India entirely from the East India Company to the British government, and Lord Dufferin, the Secretary of State for the Home Department, introduced (March 24, 1868) a bill for the same purpose.

Having now brought down the historical details as far as they are known at the present time (March, 1868), we shall give an account of the chief products of British India, and also of the commercial progress which has been made there in recent times.

The products of India are as numerous as its surface is diversified and its climate various. The staple products are cotton, indigo, sugar, hemp, flax, opium; maize, wheat, rice, and other cereals; besides which there are tea, spices, gums, dyestuffs, and many articles of minor note.

Cotton is the leading feature of Indian agriculture. There is little land, save that which is sterile, swampy, desert, or unhealthy, which may not be cultivated; and the soil on which it can be grown. In most of the large lands upon the plain country, it forms part of a two years' course; and outside the village walls, hand-woven have been seen from time immemorial, making the coarse cloth universally worn by the natives. The home-cotton is the fine cotton; it is immense, and geographically its growth is confined to no particular limits in the Indian peninsula, for it is found at Travancore, the southernmost part, on the coasts of Chittagong and Arracan, of the Gulf of Cutch, in the valley of the Ganges, and in the northernmost part of the Panjab. Poor porportion, its principal localities have been the district of Goorjat, in the Bombay Presidency; of Kandahar, in the kingdom of Berar; from Bunderland, in the Bengal Presidency; Belgaum, Darwar, and Bellary, in Mysore, and from the Panjab and Sind, amounting to millions of acres, are stated in the statistical returns, printed by authority, to be under cotton cultivation in the three Presi-
The quantity of raw cotton exported to Great Britain in 1854 was 1,048,336 cwts., valued at 1,641,714£; but it, by means of railroads, the great cotton field of Bihar, situated within the dominions of the Nizam of Hyderabad, was placed nearly on an equality in point of facility of transport, with the maritime cotton districts, then a breadth of land sufficient for the growth of a quantity perhaps equal to the full demand of Great Britain, might at once be made available.

The foregoing conditions relating to the province and prospects of Benares are partly in course of being fulfilled. When the great Indian Peninsula Railway shall be complete, the great rivers of the Belgaum, the Nerbudda, and the Indus, will have an outlet to the port of Bombay on one side, and to Mirzapoor and the river Ganges on the other; and the railroad which is intended to connect the cities and presidencies of Madras and Bombay, will pass through the cotton districts of Bellary and Ceylon. The cotton of Bundelcund, of the Delhi territory, or of Oude, may be seen to this day, uncleaned and unpressed, passing down the rivers Jamna, the Ganges, and the Indus, in unwieldy country boats, which drift no faster than the current will bear them along. Still more to be deplored are the efforts required to convey it in country carts, or upon the backs of bullocks, from the great cotton-field of central India towards the sea-coast, or to the banks of the Ganges. Freedom from the inconvenience of the burdensome nature of the cotton commerce may be seen struggling among unknown roads, extricated with difficulty from the sands of unbridged rivers, and passing at the rate of 10 to 14 miles a day, on one side towards Bombay, and on the other to Mirzapoor, the railway will vastly contribute to the exportation of the article. It is, however, a remedy; and if one line should not be sufficient, they should be multiplied, until the shipments of cotton from Nagpore shall be as certain and as cheaply effected as they now are from Calcutta or from the mouths of the Indus.

Great importance is attached to culture; but the nates of large tracts already employ a mode of cultivating the cotton plant in principle nearly the same as the American, but better suited in some respects to the locality. The great importance which the cultivation of the Indigo and of the cotton plant has in many parts of India, and the situation of this substance in the market, has brought it into great demand in this part of the world—what benefits it has conferred on the soil of the lands—this is, in the way in which it is gathered and stored, and chiefly in the way in which it is separated from the seed, and prepared for the market, as well as in its transmission to market. At the gathering the effort for improvement should commence.

The introduction of improved methods of cleaning and packing is of the first importance. The cultivation has to contend with sundry disadvantages, but those are compensated by the superior character of the produce. It is found that in many parts of India being only 14£ per lb, while in America it is from 50 to 100 per cent. more, ranging from 2d to 3d.

The Indigo is one of the principal articles of produce of the Bengal Presidency. It is grown to some extent in the alluvial soil of the North-Western provinces; but Bengal proper, below the junction of the rivers Jamna and Ganges, is its chief locality. There is a considerable cultivation of the plant in the Madras territory, and in Cochin, the southernmost district of the Panjab, as well as in Sinde; but in none of these countries has the manufacture of Indigo had the benefit of that European superintendence and skill, which have brought this dye to such perfection as it is now in Europe. It is grown in Bengal under a degree of skill which, in a climate favourable to the plant, and backed by the cheapness of labour in Bengal, has enabled them to bid defiance even to the more practised manufacturers of the west. The culture and manufacture, being established, Indigo has continued one of the staple products of Bengal. The quantity imported into the United Kingdom from India in 1854 was 64,964 cwts., valued at 1,464,134£.

Jute-Canvas is another of the indigenous productions of India, from whence it has been supplied to other countries, where, especially in the West Indies, it has been brought, by European skill and culture, to yield a far better substance than the sugar of the country from which it was originally imported. It is styled ‘Jute’ in India, and ‘Jute’ elsewhere; but, with regard to this article of commerce, should not compete with any other country in the world. In various parts, it has soils and climate which are capable of producing the cane in the greatest perfection. In the whole of Bengal, in the North-Western Provinces, the Panjab, in the Madras territories, and on the east side of the Bay of Bengal, the sugar-cane is grown with perfect ease and in the greatest abundance. But, so far as observation goes, the method of propagation of this crop is faulty to a degree, and some of the leading principles of vegetable physiology are set at nought. The cane attains, in some places, a height of eight or ten feet; it has numerous ramifications in its roots, and several long roots; the top produces an extraneous shoot set so close together, that either air nor light can sufficiently penetrate for the proper development of the plant, and the deposit of the full proportion of ascarine matter which is essential to a perfect article. It is said of this plant, with regard to both its cultivation and the manufacture of it, there is more room for improvement, as well as greater prospect of success, than with respect to any other agricultural product of India. A few sugar factories, superintended by Europeans, have been established and are successfully worked, but if one tithe of the attention should ever be paid to sugar in the East, which it has met with in the West Indies, the results to India, as well as to England, would be very great. Already it forms an important article of export from British India, the quantity imported into the United Kingdom in 1854 having been 776,189 cwts., valued at 891,708£. Samples of East India sugar sent to this country have been pronounced equal to any from the West-Indies. But to give the sugar success it is necessary to make it profitable, it is necessary to pay as much attention to the culture of the cane as to the manufacture of the sugar.

The true Hemp-Plant is common to nearly all Asiatic as well as European countries, but is believed to be of Eastern origin. In India, it is grown in many, perhaps the greater part of the districts of the Himalayas, it is not cultivated for its fibre, but for the intoxicating juice it contains, which is manufactured into the delirious drug termed Bhang. In almost every part of India it is cultivated and planted widely, for the better production of which, it is now in great request. Hemp is of great utility to commerce; but, it is remarked, the hemp of the Himalayas is different from that of Russia, Poland, and Italy. The hemp of the Himalayas, a district of the Himalayas, the north of the Panjab, has recently acquired some celebrity, having proved on trial superior in strength to even the best Russian hemp.

There can be no question with regard to the practicability of producing here of a quality suited to the European market, over vast tracts of country on the lower slopes of the Himalaya Mountains. It has been stated, on good authority, that Himalayan hemp may be landed in England, including all charges, at from 2d. to 3d. per ton, and it is said that its value here would be 36£.

But there are other fibres considered as substitutes for hemp, which are received from India, and have become most important articles of commerce. The Bum of Bengal, and Jute, and Gunny, which is manufactured from these, these products are from plants totally different from the true hemp, which has just been described.

Sisam, or Indian Hemp, under which name the article is exported from that country, is the produce of a leguminous or podded plant, and has a close resemblance to the Spanish hroom, which is a sub-division of that order. It is cultivated everywhere in India for its fibre alone; and with this object, the natives affirm, that the thicker it is grown the better it is, on the principle of—'sow thick that the wind be no friend to thine enemy;" which is a proof that, without any acquaintance with the physiological reasons by which the correctness of this system can be shown, they have, by long practice and observation, arrived at the true method of culture. In their treatment of the plant however, after it has come to maturity, they have much to learn, in order that the fibre may be produced in the best state for the markets of Europe.

The fibre of Jute, or Jaw's mallow, has not been till lately an article of commerce; but within the last few years it has been much employed in our manufactories. In India it has been long employed for making both cordage and cloth. The material is obtained from two distinct plants, one of which appears to abound chiefly in India and China, and is termed the Jute Plant; the other, called Jute. The quantity of hemp, gunny, jute, &c., exported from the three Presidencies, but much the largest part from Bengal, amounted in the year 1854 to 570,320 cwts., valued at 200,476£.
Flax, or the linseed plant, has been cultivated in India from its earliest time, not for its fibre, but only for its seed, from which the well-known oil is expressed. It is accordingly sown, not thickly together, as is the case with sunn, which is grown for its fibre, but along the margins of fields of other crops, where the sun and air can freely reach it, and in the same fields from which its seed depends.

But, if in India this plant could meet with some portion of the attention which is bestowed upon it in Russia, Poland, Belgium, Germany, France, Italy, and Ireland, it would, no doubt, become important to India, as it is already so for its seed. The quantity of linseed and flax-seed imported from India into the United Kingdom in 1854 was 196,570 quarters, valued at 601,994.

It has been already stated, that the winters of Hindostan, and certainly of the upper Indian provinces, the north and north-western provinces, are so temperate as to resemble the autumns of Europe. For a season ranging, according to latitude, from October or November to March or April, all trace of the tropical heats seems to have disappeared, cultivation of nearly all the European types occupies the soil. Abundance of wheat and barley are grown in this interval, being sown towards the conclusion of the rains in August or September, and reap'd in April before the heat set in. The wild grasses, too, that spring up amongst the crops, may this enrich the golden corn; not a single hedge marks the boundary of one field from another, nor even of the numerous village lands; and on an apparently interminable level plain, there is nothing to arrest the eye over this rich expanse, save the great trees that mark the entrance to the villages and their wells. No wheat comes from India to this country; but rice, which is grown in vast quantities as food for the inhabitants, is also exported to the United Kingdom; the quantity in 1854 having amounted to 2,851,285 cwt., valued at 875,977.

Allusion has just been made to the introduction of the Tea Plant in India. In 1834 Lord William Bentinck determined upon attempting the cultivation of tea in India. Dr. Rogie, who was sent out by the Government of the East India Company to examine the Resources of India, says: "A committee were then assembled for the purpose of submitting to Government a plan for the accomplishment of this object." But so far back as the year 1827, Dr. Royle had drawn attention to this matter, and pressed it upon the notice of Government. "The tea plant," he stated, "delights particularly in sheltered valleys, the declivities of hills, or the banks of rivers, where it enjoys a southern exposure to the sun. But it is found also to grow on the rugged tops of mountains; and although it appears to attain the greatest perfection in the climate of West Nankin, yet it flourishes in the northern latitude of Pekin, and in Japan, as well as about Canton, and these places are comprised within the parallels of 30th and 40th north latitude." Dr. Royle had observed that the tea of the Himalayas, or at moderate elevations, there was considerable prospect of success in the cultivation of the tea plant; for the different elevations allow of every variety of climate being selected, and the geographical distribution of the plant is sufficiently extended, and the natural sites sufficiently varied, to warrant its being beneficially cultivated. Taking the extreme limit, the Himalayas extend over 45° of latitude, but not making more than 10° of neither in its whole extent. Though the effect of longitude no doubt produces difference in climate, yet as this is chiefly influenced by latitude and elevation, it is evident that along the whole extent of this mountains country, there must be many localities which differ little in latitude and in elevation, and within the same locality the climate must vary, and therefore probably also in vegetation.

In the hills of Assam, the tea plant was found to be indigeneous. Plants also were procured from China, "as well as seeds and cultivators, to carry on the experiment;" and it was resolved that when the practicability of producing the kind of the tea most commending to commercial purposes shall have been ascertained, it may be safely left to the enterprise of individuals. This course has been strictly followed. The Court of Directors, and the Government of India, have consistently exerted their utmost efforts to the successful issue of the tea plant, have handed over its further extension to a private company, who, engaged in the cultivation and preparation of tea in Assam, for the half-year ending the 31st March 1856, amounted to 19,6551.

In the Kohra district, quite at the other extremity of the British territory, still on the lower slopes of the Himalayas, in the Murree Hills, and in Ghurwal, Kumaon, and the Dehra Doon, and Darjeeling, similar successful experiments in tea culture have been made, and annual produce of quality white tea at a price. Its cultivation by the natives has been encouraged by grants of land on favourable terms; but too much is not to be expected of them in this respect, as they will succeed except under European superintendence. It can only, therefore, be expected that tea will be produced over the great extent of the Himalayan range which bounds India on the north, and which contains such important commercial companies, like that which has succeeded in Assam. Besides the Assam Company, another has been recently established for the growth and manufacture of tea in Darjeeling, a part of the Himalayas to the eastward of Nepal.

The iron is in small lumps from one or other of these districts. In the Kumaon Hills, vast beds of hematite iron have been recently brought to notice by Colonel Drum-
mon. Unfortunately no coal occurs, nor is likely to be found within any reasonable distance; but abundance of charcoal can be made from the boundless forests with which the lower slopes of the Himalayas and the plains adjacent to the Ganges are clothed.

There are copper mines worked by the natives in several districts of the Himalayas; but the produce is small, and India has never supplied herself with this metal. Brass vessels are above all use; but copper, spelter, and manufactured brass are imported annually at the principal ports of the three Presidencies, to a large amount. The natives of Hindustan have neither possessed the capital nor the skill to mine deeply, and to abstract the riches which lie buried in their mines. This is one of the greatest misfortunes of the country.

The southern portion of the Tenasserim Provinces, from the province and latitude of Tavoy, to the Pakchan river, abounds with the ore of tin, which is found in the greatest purity in the beds of streams, and in hills of disintegrated granite on the plain. It is a pure perekUse, requiring the application only of a moderate heat to produce the perfect metal. The quantity hitherto prepared in the British territory, can be reckoned only as an indication of what might be obtained if labour and machinery were duly applied to the task. The extent of tin-working which has been carried on in Tenasserim, has not been by the natives of that province, but by the enterprising and more industrious Chinese, who are in almost every case the only miners of tin that can be seen dotted here and there in the forests. They have a smelting establishment at the mouth of the Pakchan river, and the tin is carried away in junka to Pananag and Sagain.

It is an article of manufacture in India almost exclusively for domestic consumption, the value exported being insignificant.

Sufficient has now been said of the most independent industries of India, to show in what her real wealth and value to England consist;—above everything, it has been intended to prove that, in comparison with the actual produce of her soil, all else sinks into insignificance when we contemplate the resources, or endeavour to ascertain the material progress of that country.

There is no step which has a more direct bearing on this subject than the irrigation of the land by artificial means. There are traces in various parts of the country of works constructed in ancient times for this purpose. Canals and reservoirs have been in India long known and useful. The discharge could be regulated and distributed when the ground was parched. It has been commonly and with some justice remarked, that to furnish the native cultivator with the command of water is to give him nearly everything he wants. It is now properly brought to the notice of the world.

The East India Company, following the example of the Moguls, their predecessors in the government of the country, have greatly extended the means of irrigation in the North-Western Provinces, in the Panjub, and in the Presidency of Mysore.

With regard to irrigation canals, the waters of both the Jumna and the Ganges rivers have been freely drawn upon. The country on the right and left banks of the Jumna, from Susanger to Allahabad, and even south of Allahabad, may be said to be secure against drought, cultivation now, over a large surface, being entirely independent of the periodical rains. The Eastern Jumna and the Western Jumna Canals, with their branches, are 450 miles in linear extent. The volume of water available for irrigation from this river, has been calculated at 8,370 cubic feet per second, and each cubic foot has been found adequate for the annual irrigation of 315 acres of land; but as one-third of a district only is necessary, the needs of the Ninghal and the Jumna canals will be exceeding, one cubic foot of water per second will suffice for 654 acres of land, equal to about one square mile, so that the canals of the Jumna are supposed to serve for the irrigation of 3,870 square miles.

The Jumna is still nobler work. Nearly the whole tract of country comprised between the rivers Ganges and the Jumna, from Hardwar to Allahabad, is included in this large system of irrigation for the North-Western Provinces. The main line of this canal, which was completed, and received water for the first time in 1854, in 856 miles in length. Its extreme breadth is 170 feet, and its greatest depth 10 feet; and, as truly described by the Lieutenant-Governor, "it is a work which stands unexceeded in its class and character among the wonders of the world." In the time of its construction, it shall be finished the canal will be about 900 miles in length, and the area which may be irrigated by its waters is stated to be not less than 1,470,000 acres. It is adapted also to navigation. No sizable canal in Europe has attained to half the magnitude of this Indian work. It nearly equals the aggregate length of the five greatest canals in France. It greatly exceeds all the first-class canals of Holland put together, and it is greater by nearly one-third than the greatest navigation canal in the United States. It stands thus as one of the greatest triumphs of the engineering art of which any country can boast. Its total estimated cost is 1,666,648/, or of which 1,400,000/ had been expended up to the beginning of the year 1857.

In the Panjub a system of similar canals has been projected and partially commenced, to afford the means of irrigation to the greater parts of the tract of country comprised between the rivers Ravee and the Sutlej. With the branches, the total length when finished will be 450 miles, and the cost 500,000/.

The head waters, like those of the Ganges and Jumna canals, will be taken from the rivers at a high level, and carried along the slightly elevated ridge which is generally found to exist between two rivers, having a gentle declivity on each side, and so designed as to be suited to the country. But towards the southern part of the Panjub, at and below Mooltan, and on each bank of the Indus, another description of irrigation canal prevails, which has been formed by taking advantage of the annual inundation of the rivers. The waters of the Indus are collected in the Godavery, the Cauvery, and the Krishna rivers, so as to store up their waters and distribute them at pleasure during the dry season. These works on the Godavery have cost about 950,000/., on the Cauvery 60,000/., and on the Krishna 150,000/., and, notwithstanding the number of the localities are endless, both in that Presidency and in various other parts of India, where similar works might be constructed with the greatest advantage.

Next in importance to the future progress of India, and in a still wider sense than may yet be known, not only with regard to its material interests, but to its social and moral advancement, is the continuous chain of iron roads by which it is hoped, that before many years shall have passed, the whole of the Indian Empire will be linked together. The natives of every class and caste, contrary to general expectation, unimprovable of any prejudices, living together in the same railway carriage, have seized with avidity the advantages of the locomotive train in Bengal, Madees, and Bombay. The opening of the railway for short distances at Calcutta, and the two other Presidencies, has been hailed with acclamation by the whole people, who flocked from their villages for miles to see the progress of the works.

The grand trunk lines now in progress of construction are of great extent. From Calcutta the main line will lead through the entire valley of the Ganges, for a thousand miles to Delhi, with an eventual extension, in the same general direction, across the river of the same name, to the Kandershe, Saugor, and Bundelcund, branching into the great cotton-field of Central India to Nagoop, and affording an easy outlet for that valuable product, either to be shipped at Bombay, or for conveyance down the river Ganges, from Mirzapoor to Nagpur, and from the Nile to the Bengal. At Miliase is a still nobler work. Nearly the whole tract of country comprised between the rivers Ganges and the Jumna, from Hardwar to Allahabad, is included in this large system of irrigation for the North-Western Provinces. The main line of this canal, which was completed, and received water for the first time in 1854, in 856 miles in length. Its extreme breadth is 170 feet, and its greatest depth 10 feet; and, as truly described by the Lieutenant-Governor, "it is a work which stands unexceeded in its class and character among the wonders of the world." In the time of its construction, it shall be finished the canal will be about 900 miles in length, and the area which may be irrigated by its waters is stated to be not less than 1,470,000 acres. It is adapted also to navigation. No sizable canal in Europe has attained to half the magnitude of this Indian work. It nearly equals the aggregate length of the five greatest canals in France. It greatly exceeds all the first-class canals of Holland put together, and it is greater by nearly one-third than the greatest navigation canal in the United States. It stands thus as one of the greatest triumphs of the engineering art of which any country can boast. Its total estimated cost is 1,666,648/, or of which 1,400,000/ had been expended up to the beginning of the year 1857.
Indus, which seems to be a first step towards a direct rail-way, or mixed railway and river steam communication, from the Panjib to the sea. In the Presidency of Madras, two trunk lines are projected: one to penetrate the peninsula in a longitudinal direction, and to connect Bombay, passing through some rich cotton ground in Darwar and Belgaum; the other to strike across to the western coast, having its other terminus at Bombay. At the beginning of 1837 the number of miles of railway already opened for traffic at the three Presidencies, and the extent of each line actually in a state of progress, are as follows:—

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</thead>
<tbody>
<tr>
<td>Bombay to Delhi</td>
<td>1,369</td>
<td>324</td>
<td>750</td>
<td></td>
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<td></td>
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<tr>
<td>Bombay to Bombay</td>
<td>71</td>
<td>300</td>
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<tr>
<td>Bombay to Belgaum</td>
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<tr>
<td>Bombay to Belgaum</td>
<td>...</td>
<td>296</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Madras to West Coast</td>
<td>90</td>
<td>300</td>
<td></td>
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</tbody>
</table>

Total: 330, 2,895

When these grand trunk lines of railway shall have been completed, a glance at the map will show that, although the richest parts of the peninsula have not been penetrated, the principal cities connected, the 3,926 miles of which they consist, are but the foundation and groundwork of what will be ultimately required, before it can be said that India is completely provided with communications; before, in fact, many of the inlying districts can be supplied with food, when their own internal resources may fail.

Inland steam navigation has existed for several years on the river Ganges, and also upon the Indus; but not by any means to the extent which even the private traffic of Bengal and the Punjab requires.

The ordinary highways of India is a subject which cannot be regarded with much satisfaction. Until the period when Lord William Bentinck governed the country, the subject of roads does not appear to have attracted much attention from the State. The communications of the country were in a most neglected condition, consisting of native wheel-tracks, or little else. Above Allahabad, and in various other parts, a regular system of roads, a regular arrangement in country, of relief from one station to another, had to be proceeded by a native guide. This is now altered. Roads, even if unbridged and unmetalled, exist in almost every district; and there are three grand lines of communication of considerable length; the earliest begun only in 1836, from Calcutta, and recently prolonged to Peshawur: this, however, is not yet complete in parts.

The three grand trunk roads constructed and maintained, are as follows:

<table>
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<tr>
<th>Length</th>
<th>Cost</th>
<th>Annual Repairs for Maintenance</th>
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<tbody>
<tr>
<td>from Calcutta to Peshawur</td>
<td>1,423</td>
<td>1,423,000</td>
</tr>
<tr>
<td>from Calcutta to Bombay</td>
<td>1,002</td>
<td>500,000</td>
</tr>
<tr>
<td>from Bombay to Agra</td>
<td>734</td>
<td>243,750</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,159</strong></td>
<td><strong>2,166,760</strong></td>
</tr>
</tbody>
</table>

The average annual expenditure upon public works of all kinds in India during fifteen years, between 1837 and 1852, was 289,732l. In this are comprised roads, bridges, embankments, canals, tanks, and all works of irrigation; but since 1856 the outlay has been much greater, including the sums spent upon the Ganges and Punjab Canals, and the guardianship interest upon Railway Stock, which must be regarded as a contribution to public works.

The electric telegraph, which has been recently established with so much rapidity and success, can scarcely be regarded as a public work. As nearly upon the wants and welfare of the people, as other public works which have been briefly described. Except inasmuch as it is an aid to good government and to the preservation of peace, the rapid transmission of intelligence from any part of the country to the other, is as yet slightly regarded by the native community, but when traffic shall be accelerated by the railways, it will not be long before the telegraph will be rightly valued. More than 4,000 miles of telegraphic wire are now set up in India, and in constant use. The superintendent, Dr. O'Shaunessy, availing himself of the executive officers of Government throughout the country, to set up the posts and to build pillars for the support of the wires, and with his own trained engineers, has enabled the public service to be established from England, was enabled to complete the communication between Calcutta and Agra, a distance of 800 miles, in the course of five months. In fifteen months, all the lines from Calcutta to Agra, and from Bombay, and the lines behind over 2,000 miles of space, were ready for use. Other places more distant have since been embraced in the electric circle, and the average cost of these 4,000 miles does not exceed 560l. per mile, although the physical obstacles encountered have been great.

INDIAN TERRITORY, United States of North America, an extensive tract of country set apart by the Congress and federal government, for the permanent residence of the various tribes of native Indians removed from the settled states and territories of the United States, is an area, in which it lies generally, 9° 30' and 39° N. lat., 94° and 100° W. long., but the limits are not very strictly defined. It is bounded S. by Texas; E. by Arkansas and Missouri; and N. by the newly created Territory of Kansas. The area, as given in the "Reports of the Census" of 1860, is 157,171 square miles, but this is considerably more than in previous statements of the area of what is sometimes called the Indian Territory proper, and perhaps includes a portion of the country since appropriated to the State of Kansas.

In the south-eastern portion of the Territory, there is a range of hills of moderate elevation; the remainder is a plain, or ma
doubtedly the southern portion of the country, is a large district of prairie ground, but along the rivers there is a good deal of timber. The country is well supplied with water, having several good-sized rivers running through it or along its borders on their way to the Missouri and the Mississippi. The Aransas flows through the southern portion of the country, and across the southern boundary, and receives in its passage numerous tributaries, some of considerable size. The chief of these tributaries is the Canadian River, which also has numerous branches. Its right fork, the Red River, wanders the southern and the Kansas the northern portion of the state; both of these, as well as the Arkansas, are navigable within the territory at certain seasons by steam-boats. The country possesses capabilities for the prosperous maintenance of a large population. The middle, and by far the largest part of the country, appears to belong to the Lower Carboniferous series of rocks. On the east are Upper Carboniferous strata, or coal-measures, a part of the great coal-basin of Missouri and Illinois. The western and northwestern districts belong to the Grand Canyon series, and the belt of Lower Silurian rocks, consisting along the Red River of blue limestones, with impure rocks. Coal is not the only mineral. Both lead and iron are found; and there are large beds of salt springs, which might be made use of for the manufacture of salt. The climate is generally healthy. The northern parts are subject to keen westerly winds from the Rocky Mountains, and the winters are rather cold; but in the southern parts the winters are mild, and all the plants are cultivated which are raised in other parts of the United States of the same latitude. The soil on the eastern side of the Territory is generally fertile; the northern parts are well adapted for grazing cattle. Wheat, maize, and other grains, produce good crops in almost every place where they have been tried.

As already said, this large tract of country has been appropriated for the permanent residence of the Indian tribes transported from the settled parts of the United States. It was regarded as a good test of the capabilities of the country. But they have shown that they are capable of steady industrial efforts, and they have made very considerable advances in civilization. Under the guidance of missionaries, who have settled amongst them, and with the sanction and concurrence of the Commissioner of Indian Affairs, some of the larger tribes have established regular governments, legislatures, judicial officers, churches, schools, newspapers, &c.; have introduced the manufacture of agricultural implements, cloth, and most articles of ordinary domestic use, and have set up trading posts, with a considerable amount of skill; rear horses and cattle; build houses; and export to neighboring states maize, cotton, hides, &c. By the treaty of removal and settlement, the federal government furnishes them with blacksmiths, wheelwrights, and some other mechanics, and at their settle,
The principal Indian tribes settled in the Territory are the
Cherokees, who numbered according to the Commissioner of
Indian Affairs, about 17,600 in 1853, but whose numbers are
usually estimated much higher; the Chicksaws, with about
4,900; the Creek, 16,000; the Choctaws, 4,941; the
Chickasaws, 4,797; the Pottawatomies and Chippewas, 4,680;
the Pawses, 4,500; the Seminoles, 3,000; the Sacs and
Foxes, 2,737; the Shawnees and Senecas, 1,400; Delaware, 1,130, &c.
The Cherokees occupy the whole of the eastern part of
the north of Arkansas, and adjoining the state of
Arkansas, and are the most civilized of all the Indian tribes.

The Chocktaws occupy the most southern point of the
territory between the Red River and Canadian River. The
Chickasaws, whose territory is about as great as that of
the Choctaws, is settled by two tribes, one of which
inhabits the northwestern part of the state, and the
other the southeastern. The Creek, the most populous tribe
in the state, occupies the whole of the northwestern part
of the state, without distinction of races, and are
composed of various tribes, 

1. The Capitolium. The undeveloped axis is here nearly
enlarged upward, with a feathery or spongy substance, and
the more so if the number of flowers is very great. It may be
more minutely designated as simple, double, capitate, lageno-
form, conical, and cylindrical, as it approaches nearer to
one or another form. The cap or one part of the cap
passes gradually into the epixis. 

Special varieties are:—

* The Calathium (Anthodium, Ehrh.; Flora Composita,
Linn.), a many-flowered capitulum, whose single flowers
stand in the axis of more or fewer stunted bracts, and are
surrounded with one or more circles of sterile bracts, as in
the family of the Compositae.

** The Cenanthisium, Nees (Hypanthodium, Link.).
Exactly like the preceding inflorescence in some
Urticaeae.

1. The Cyme, defined by the shape of the peduncle in
Ficus is no distinction, except in those which is
wider than the peduncle; and it exists in some
Dorstenia, the Cymetium, the Cymetum, and the
Composita, and some others.

*** The Spadix, Bickel, the simple inflorescence of the
Grasses and Cyperaceae; namely, a few-flowered spike,
whose flowers have no bracts, surrounded with the same,
or two stant bracteae (Gymnophyllum).

2. The Umbel (Umbellifera) when
compound termed an Umbellula (Umbellula) 6.

3. The Raceme (Racemum) occurs in very different forms;
usual to distinguish in it—

The Cymetum (Corymbi), a pyramidal raceme.

β Inflorescentia Centrifugae.

5. The Cyme or False Umbel (Cyme), is a corymb
with Inflorescentia Centrifugae.

That only singular cases are distinguished in these is a
proof of the totality of scientific patching together of our
terminology. The compound raceme, the compound umbellum,
and capitulum, with inflorescentia centrifugae are all called
the Cyme (Cyme), which is contrary to the commonest scientific
laws. De Candolle has a different appellation for the same Cyme
Inflorescentia centrifugae, and he adds the fiction, that the
undermost first-blooming flower is really the terminal
blossom, and the second, the terminal blossom of side axis, is developed in a
disproportionate degree, &c. From the rolling up there is
just as little to be deduced as from the same phenomenon in
the leaves of Ficus and Oxalis. The position of the
bracts, as seen in Ceratost, contradicts this fiction; and the
history of the development, which can alone determine the
point, appears to prove that here a one-sided raceme or spike
is present, whose unrolling is only a peculiar situation of
the kinds.

C. Once-Compond Inflorescence.

a. Pure or Homomorphic

** Inflorescentia Centrifugae.

6. The Spike of the Grasses (Spica), several spikes united
in a spike-like arrangement, as in the Grasses; the component
spikes are termed Spiculae (Spiculae).

7. The Umbel (Umbellula). Umbels united in umbels; the
components are termed Umbellae (Umbellae).

Sound terminology would have long ago rejected these
words, and exchanged them for Spica and Umbella Compo-

4. The Solitary Flower, as terminal or axillary-flower (Flo-
Solitaria, terminalis vel axillaris). The latter may be
situated in whors, and then form a Verticil (Verticillus).

B. Simple Inflorescence.

* a. Inflorescentia Centrifugae.
10. The Anthela; see No. 16.

* Inofficiens Centrifuga.

See No. 14.

** Inofficiens Centripeta.

See No. 11.

D. Many-Times-Compound Inofficiens.

* Inofficiens Centripeta.

11. The Panicule (Panicula), every many-branched information of apples universally, and otherwise wholly in developed pedicels. 12. The Thyrs (Thyrsus), a panicule, with very short pedicels; with the exception of Grasses, found almost universally.

Both terms are applied also to once-compound inflorescences. De Candolle uses the term Thyrsus for those in which Inofficiens Centrifuga and Centripeta are mingled; others differently; all arbitrarily.

13. The Anthela, an inflorescence that has the kind of aspect of that of the *Amoranthus caudatus* or the Cephemiales.

** Inofficiens Centripeta.

14. The Cyme (Cyma), also in manifold combinations, in which however we do not consider whether the side ramifications follow the Inofficiens Centripeta or Centrifuga in longer pedicels.

15. The Bush (Fasciculus), a manifold compound cyme, with pedicels, and rather crowded.

16. The Anthela, all kinds of inflorescences in the Juncoceae and Caryophylaceae.

The Glomerules (Glomerules) many inflorescences that appear almost like capsulaceae, and consist only of ill-formed, imperfect flowers, as in some Chamomilaces, Urticaceae, and Juncaceae.

We subjoin Professor Schleiden's closing remarks:—

I leave every one with thinking faculties to draw for himself the sad conclusions which the preceding survey affords; and I think that I have not to defend myself to any one who is acquainted with our literature, against the charge that the foregoing is a frivolous vagary of my humour. Köper first attempted a scientific development of the inflorescence.

No one that I know of has followed him, except Lindley. Physiologists seem not to have accounted it of sufficient importance. Systematists have too much to do with their herbaria, and it is much easier to coin a new word than to study intelligently the processes that have produced them in a large numbers of species. For the sake of those unacquainted with these matters I will insert the following examples:—In *Lotus corniculatus*, Koch (*Syn. Fl. Germ.*) has a Capsulatum, Kunth (*Fl. Berol.*), an Umbella, Reichenbach (*Fl. excurs.*), and *Eryngium corymbosum* to *Entherium eorymbosum* Kunth, gives a Spica; Koch, a Spicula. For *Cladosium Maritimum* Kunth has Umbella Axillares et Terminalis; Koch, Anthela Axillares et Terminalis; Reichenbach, Cyme Axillares et Terminalis; *Icelpus subfasciatus* Koch has Spicula in Fasculatum aggregatum; Kunth, Spica Conglomerata. I have here omitted the French and English botanists, or the matter would have been still more glaring.

INFUSORIA. At the time the classification given under the names of the above groups was drawn up, the distinctions that limit the vegetable and animal kingdoms were less perfectly understood than at present. One of the first members of this group of organised beings that was withdrawn from the animal kingdom was the Dendrocysta, which are now generally recognised as plants. [Dendrocysta, S. 2.] The group of *Paraspidoptora toricata* must also be placed amongst doubtful creation, although many physiologists do not hesitate to group them amongst plants [*Diatomeeae*, S. 2.], whilst the groups *Monadina*, *Volvocaceae*, and *Paludicula* have recently undergone the most searching investigation, with the result that many of these forms are more decidedly vegetable than animal in their character. Some have even gone further than this, and have deduced the *American Journal of Science*, for 1832, thus writes to Mr. Dana:—"You may remember a paper read at the meeting at Cambridge, United States, in August 1843, in which I showed that the embryo which is hatched from the egg of *Platyrus* is a genuine polygastric animal.
ment and evolution of a Tricodium, a discovery which Ehrenberg has attempted to explain by the supposition that the Microscopium, or Infusoria, resembles the shell of an animal which to its own accommo-
dation has its bluish color seamed upon its sides with brown and orange. Dr. Stein's important researches are continued through the family of the Vorticellina, and his observations given upon 

Actinophrys, Polyphaga, the genus Tricodium, and on the nature of the Oligonema, the propagation of the Chloronema and of the Polysiphonum, the body of which is a single cell or an aggregation of cells, which derives its nutri-
tion by absorption from without. Professor Kohler has recently described the method by which one of these bodies, the Polygastrica of the Polyzoa, was studied. The case in question was of great interest, and it was observed

"As regards the vegetable functions," says the Professor, "the mode in which the Actinophrys is nourished is one of the highest and most special interest. Although the creature has neither mouth nor stomach, yet it takes in solid food, and rejects what is indigestible. This marvel, for so it may almost be called, is thus effected with minute Buccinatum (Kolli-
ker, minute species of Lymnesa, the young of Cyclops, &c.), and the lower Alga (Diactonema, spots of Vauxoula, Clastotetra, &c.), which in its progress through the water it approaches and in the act of attack seizes and compresses. When an Infusoria or Vorticelle is in contact with it, both plant and animal, as soon as they touch one another, the tentacular filaments, usually adhere to it. Now, as the filaments with their prey slowly shorten itself, and the latter appears to be devoured. The body of the 

infusoria is gradually thrown out to the extent that the filaments apply themselves upon itself, bending their points towards the animal, so that the captive becomes gradually inclosed on all sides. According to all appearance these filaments also become more or less shortened. In this way the morsel is gradually brought to the surface of the body, the principal by which it was seized, being finally so much shortened as to disappear altogether, and having, as not unfrequently happens, relinquished its hold upon the prey, after the latter has become encompassed by the surrounding filaments. These gradually apply themselves more and more closely together around it, forcing it towards the sur-
face of the body.

The following account now takes place: The spot of the surface upon which the captured animalcele is lying slowly retracts, and forms at first a shallow depression gradually becoming deeper and deeper, in which the prey, apparently adherent to the surface and following in its retract

ion, is gradually lodged. The depression by the continuous retraction now extends into the imprisoned animalcele, which up to the time had projected from the surface of the Actinophrys, disappears entirely within it; and at the same time the tentacles, which had formerly rushed out, are forced to surround it, again

erect themselves and stretch out as before. Finally, the depression acquires a flask-like form by the drawing in of its

margin, the edges of which coalesce, and thus a cavity closed on all sides is formed in which the prey is lodged. In this small cavity remains for a longer or shorter time, gradually

approaching the central or nuclear portion, and at

last passing entirely into it, in order to await its final de

structive. In the mean while the external portion of the

infusoria recovers its pristine condition.

The enucleated morsel is gradually digested, and is readily seen by its change of appearance from time to time. If entirely soluble, as for instance an Infusoriaumin, the space in which it is contained contracts as the dissolution of the bodies and final disappearance of the object. Should there be however an indigestible residue (a membrane composed of cellulose, a portion of chitin, a shell of a

Lymnesa, or case of a rotifer, &c.), a passage for its exit is formed, and it is expelled by renewed contractions of the Homogeneous, the eduction in the cavity, and the diameter of the vessel contracting as before, so, as that which the morsel followed in its introduction.

The passage and the opening through which the expulsion was effected disappear again without leaving any trace."

The characteristic point in the Actinophrys, and in the Vorticelle, is the existence of the creature which inhabits the shell of the large family of Foraminifera, and Dujardin suggests that the foraminiferousiferous forms are transitions to the more decided forms of Foraminifera. Hence he proposes to include several forms of Ehrenberg's Infusoria, with the Foraminifera or Polyclamia, under the term

Hydroidea. Little therefore is left to say of what may be regarded as true Polygastrica. They all appear to have a distinct mode of life, and it is found in the cavity of the body, and this is usually surrounded by vibratile cilia, and is seen in Monas atomos and Leucophora patale. These cilia ap

parently bring the food to the mouth of the animal. An anal orifice is described by Ehrenberg in the majority of the Polyclamia. With the name of Monas at atomos, or carmine or indigo (a writer in the "Microscopical Journal" recommends the red pigment which lines the cornes of the common house-fly) is introduced into the water in which they are contained, the trans-parent body of the animalcelle is speedily seen to be stained with color, and portions of the ciliate appear to resemble an aggregation of the particles of colouring-matter. Ehrenberg regarded these globules as distinct sacs, which he supposed were given off from a central intestinal canal, as seen in Leuophorus; and he supposed that in many stomachs, he gave them the name of Polygastrica (many-stomached). It is however still a question as to whether in any case these masses are contained in a distinct sac. The whole body of the animalcelle is often covered with vibratile cilia, and it is to the constant action of these organs that the varied movements of these animalcelles are due. The movements thus effected are perfectly automatic, and in no way connected with any intelligent conscious

ness. All the movements of these organisms are not due to cilia, as the whole of the tissue of the animalcelle is capable of contracting to contract in Amoeba, Amphipitus, and the stalk of the Vorticelle.

— Although Ehrenberg has described a complicated apparatus and the retraction of the instanter contents and cilia, it is amongst the true Polygastrica. Their modes of multiplica

tion are by fission and gemmation. In a large number of cases a simple division of the unicellular organism into two equal parts takes place. This process goes on so rapidly that, according to Ehrenberg, a single Foramensculum could produce 268,000,000 of cells in a single month. From ana

logy we must suppose this process would not go on continu

ously, and, as in plants, we must regard the separate cells thus produced as belonging to the same individual. Further observation is probably only needed to demonstrate the existence of a union of two cells—a sperm cell and a germ cell—as is now known to be almost universal in the vegetable kingdom. In the account above given of Stein's researches it will be seen, that it is not improbable that the manner of the modes by which these beings are enabled to spring suddenly into existence, is the production of winter-eggs, or reproductive bodies of a kind that will resist the influence of an absence of moisture from the spots in which they ordina

rily abound.

The true Polygastrica seem universally diffused. Where the organic matter exists in a decomposing state, there they abound. They exist in incredible numbers in the waters of the ocean, in rivers, lakes, ponds, pools, and ditches. They have been found in the liquid of the stomachs of man in man. Wherever the organic elements, carbon, hydrogen, nitrogen, and oxygen, are capable of uniting to form water, carbo

natic acid, and ammonia, there they may be expected to be found. The composition of the liquids in which they are found, seems to determine the forms they assume. One set of forms inhabits salt water, another fresh. Every mineral
ACTED, called dissolved itsology distinguished dal 1821, in career the tit devoured numerous nance organic Infusoria, for animals, and inorganic destruction inflammatory and's ions and assimilate. Surely we must in some degree be indebted to those ever-active invisible scavengers for the salubrity of our atmosphere. Nor is this all: they perform a still more important office in preventing the gradual diminution of the present amount of organised matter upon the earth; for when this matter is dissolved or suspended in water, in that state of comminution and decay which immediately precedes its final decomposition into the elementary gases, and its consequent return from the organic to the inorganic state, those material mechanical and and's ions of the police are everywhere ready to arrest the fugitive organised particles and turn them back into the ascending stream of animal life. Having converted the dead and decomposing particles to living tissues, they themselves become the food of large Infusoria, as the Rotifers, and of numerous other small animals, which in their turn are devoured by larger animals, as fishes; and thus a pabulum, fit for the nourishment of the highest organised beings, is derived from the extremity of the realms of organic matter.

"There is no elementary and self-subsistent organic matter, as Buffon taught; the inorganic elements into which the particles of organic matter pass by their final decomposition, are the products of decomposed animal and vegetable kingdom. No animal can subsist on inorganic matter. The vegetable kingdom thus stands, as it were, between animal thought and its ultimate destruction; but in this great office of plants must derive most important assistance from the Polygastric Infusoria. These invisible animulacra may be compared, in the great organic world, to the minute capillaries in the microcosm of the animal body, receiving organic matter in its state of minionest subdivision, and, when in full career to escape from the organic system, turning it back by a new route towards the central and highest point of that system."

INGHIRAMI, CAVALIERE FRANCESCO, a distinguished Italian archaeologist, was born in 1776, at Volterra in Tuscany. From the completion of his education he devoted himself with unwearied diligence to the study of ancient art. He wrote several papers in the artistic and antiquarian journals of the day; procuring for him a high standing in art authorities; but the work which acquired for him a European reputation was the splendid publication entitled 'Monumenti Etruschi,' of which the first part appeared in 1821, and which was finally completed, in 6 vols. 4to, in 1826. This great work was intended to comprise a complete survey of all the existing remains of ancient Etruria; and it has formed the great treasury of all subsequent writers on Etruscan antiquities and the Etruscan people. His other works—see Lettere Etrusco-Francese, 8vo, 1868-69; 'Galleria Omerica,' 3 vols. 8vo, 1852 & 31, work intended to illustrate the 'Iliad' and 'Odyssey' by the monuments of antiquity; 'Pitture di Vasi Fintili esibite dal Cav. F. Inghirami,' 4 vols. 4to, 1830-37, in which it was his avowed object to illustrate the mythology and the history of the ancients; and 'Storia della Toscana, in Sette Epoca distribuita,' 16 vols. 13mo, 1841-43, the last two volumes being devoted to the bibliography and index. He also wrote many papers and papers on particulars in archaeology and history in the 'Archivio Italiano,' & Cavalier Inghirami was for several years keeper of the Laurentine Library at Florence. He died on the 17th of May 1846.

INGLIS, SIR ROBERT HARRY, Bart, many years M.P. for the University of Oxford, was the only son of Sir Hugh Inglis, Bart, formerly chairman of the East India Company. He was born in 1786, and received his early education at Winchester, and Christchurch, Oxford. Soon after taking his degree, he became private secretary to the late Viscount Sidmouth, and was appointed by him one of the commissioners for settling the affairs of the Carnatic. In 1834 he entered parliament as member for Dundalk, a borough at that time in the possession of the Earl of Donoughmore. In 1838 he was elected for Ripon; the representation of which borough he resigned in the spring of 1828, in order to contest the University of Oxford against the late Sir Robert Peel, when the latter accepted the Chiltern Hundreds on irregular grounds. In 1839, when the Earl of Donoughmore retired, the post of sheriff of the county of Meath became vacant, and Sir Robert, who had a very strong feeling in favour of the Irish National party, took it, and held it for five years, and during that time he continued to represent the University until January 1838, when he retired from parliamentary life, and was sworn a member of the Privy Council. His public life was one of those devoted to the interests of the country which it is the lot of few to accomplish, and his name is henceforth associated with that of his ancestors in the estimation of the people of Ireland. In 1849 he was appointed junior solicitor to the Athenaeum, and in this position he continued till 1851. In the year 1849 he published 'The Irish National Question,' a collection of a series of articles being his observations on the Irish question. In 1850 he died in England, at London, on the 2nd of August, and was buried in the churchyard of St. Bride's, Holborn, on the 8th of August. In 1851 he was elected for the borough of Banbury. The seat had long been filled by a representative of the Duke of Bedford, who, however, died some years before, and the representation of which borough he continued to represent on behalf of the City of London, and was re-elected in 1852. He was also re-elected in 1853 and 1854, but in 1855 he resigned his seat, having been defeated in the last election. In 1856 he retired from public life, but continued to reside in London till his death, on the 30th of October, 1860. A memoir of this gentleman will be found in the 'Quarterly Review', vol. 109, p. 216. An injunction or an offence either at Common Law or by Statute (7 & 8 Vict. c. 34.) INJUNCTION, in Chancery. One of the recent improvements in the procedure of the Courts of Equity, consists in the abolition of the distinction between Common and Civil Law. An injunction is not now thought of as it was formerly, merely as a matter of course. Sufficient primae facie grounds must be stated in all cases before it will be granted, thus in effect making all injunctions proceed on a basis of proof.

INJUNCTION, at Law. The Common Law Procedure Act, 1834, among other improvements, has enabled the Superior Courts of Common Law to grant warrants of injunction after action brought, in order to restrain the repetition of conduct injurious to the plaintiff. This is sufficient self-complaint, or because no such way avoiding the necessity of a return to the Court of Chancery. This process is, it will be observed, of very limited application, an injunction being generally sought to prevent an injury, and not the repetition of one. INNS OF COURT AND CHANCERY. A report on the present state of those societies was laid before Parliament in 1856, by certain Commissioners appointed to examine into the nature of the legal education thereby afforded. This report being however in many respects erroneous and founded on insufficient information, and its conclusions, nothing has as yet been done towards carrying out the recommendations of the Commissioners.

INSITE. [CHEMISTRY, S. 2.] INSOLVENCY. The Commissioners of the Court for the Relief of Insolvent Debtors no longer make circuits through England, to hear the petitions of prisoners confined for debt in the country districts. This branch of the jurisdiction of the Insolvency Court is now exercised by the County Court Judges, to whom the petition and schedule of the prisoner are for that purpose transmitted. The County Court Judge exercises the same authority as the Court in London, in his decision being final and conclusive. (10 & 11 Vict. c. 105.) See also below. INTRUSIONS. [See below.]

INTESTINES. The structure of the coats of the intestines has been most carefully observed by means of the microscope. The minute structure of the intestines corresponds to a considerable extent with that of the skin—which is the stomach. There are however differences of structure especially in the mucous coat of the intestines. We shall describe first the muscular structure, and in doing this we shall follow Professor Kólliker in his 'Manual of Human Histology.' The muscular coat of the smaller intestines is somewhat thicker in the duodenum and the upper portions, thins in the lower; it has in general a thickness of 2—4 mm, and is composed only of longitudinal and transverse fibres. The former are the innermost, and do not continue continuously, since they are very few or entirely absent along the attachment of the mesentery; they are usually most distinct upon...
the free border, though even here they may be readily torn away with the serrate membrane, so as to leave the second layer exposed. The latter is complete and continuous, consisting of circular bundles, which not uncommonly anastomose at very acute angles.

In the large intestines the longitudinal fibres are reduced to the three ligaments of the tube, muscular bands of 4°—6°, or even 6° broad, and 1°—3° thick, which commencing upon the edges of the submucous layers. Occasionally these bands are longitudinal fibrous layers, thinner than in the small intestines, and more especially developed in the duplicatures, which are known under the name of the plicae semilunatae.

All these ligaments have an imbedded network of muscular fibres. Many of them present knot-like enlargements and frequently zig-zag flexures, which produce the transversely striated appearance of the entire bundles of such muscles so frequently met with in spirit preparations. The arrangement of the fibre-cells in the different strata is simply this, mutually applied in their length and breadth, and coherently. They are united into thin muscular bands, which when invested with a coating of connective tissue, and frequently also united into second and third strata, constitute thicker or thinner muscular tunics of the different regions; which, again are surrounded and separated from the contiguous parts by considerable layers of connective tissue.

Blood-vessels are abundant in the smooth muscles; and they form a characteristic network with rectangular meshes. Nothing is known about the lymphatics; nor are the relations of the nerves yet ascertained, except that Ecker has observed the division of fine nervous tubules in the muscular tunics of the large intestines.

The mucous membrane of the small intestines is thinner than that of the stomach, but more complex in its structure, inasmuch as besides the tubular, or Lieberkühnian glands it presents a great number of permanent folds. The mucus membrane is also imbedded in its submucous, circular, but not longitudinal fibrous layers, the so-called submucous and Peyser's glands, and, in the submucous tissue of the duodenum, Brunner's glands. The mucous membrane consists of connective tissue which is internally homogeneous, and the detached or divided glands exist there is but little submucous tissue, so that it is pretty closely connected with the muscular tunic. Upon the inner surface of the mucous membrane there rests a cylinder epithelium, whilst externally towards the submucous tissue it is bounded by a layer of smooth muscle, discovered by Brücke, which measures at most 0'017°.

They are disposed longitudinally and transversely, but in man their slight development renders it often very difficult to discover them.

The villi of the small intestines are small elevations which can be seen, even by the naked eye, and which are therefore readily distinguishable with the naked eye, and which distributed upon and between the villus convolutes through the whole extent of the small intestines, from the pylorus to the ileum, of which every part is clothed. Besides these, together as to give the mucous membrane its well-known velvety appearance. They are most numerous (60 to 90 upon a square line) in the duodenum they are broader and less elevated, resembling folds and laminae y°—1° in height, 1°—2° or even 2° in breadth. In the jejunum they appear for the most part to be conical and flattened; frequently they are even foliated or cylindrical, or filiform, the latter forms predominating in the ileum. The length of the villi is from m°—n°, the breadth from y°—1°, or even 1°, the thickness in the flattened forms is b°.

The villi are composed of two portions, a deeper cost b) containing the mucus membrane, and an epithelial superficial cost. The contour of the former, or villus proper, is similar to that of the entire villus; it is simply a solid process of the mucus membranes containing blood-vessels, lymphatics, and smooth muscles, whose matrix, through which a vascular system of the villi in different varying strata exhibits no morphological peculiarity more decided than that of the mucous membrane itself, yet must most undoubtedly be regarded as a metamorphosed connective tissue without any of the epithelial characteristics that the villi are so numerous that when well injected those whose epithelium has been detached become coloured throughout; and in living animals, or in those which have just been killed, each villus if viewed from above appears as a red dot surrounded by a clear ring. In man every villus contains a close network of capillaries of 0'003°—0'005°, with rounded or elongated nuclei, which lies immediately beneath the homogeneous external layer of the matrix, and is supplied by one, two, or three small arteries of 0'015°—0'010°. The blood is usually carried back directly into the larger trunks of the submucous tissue by a vein of 0'020°, which does not arise as in animals, by the arching round of the artery, but proceeds from the gradual confluence of the finest capillaries. The villi have not hitherto been perfectly made out; for although the majority of investigators are inclined, like the older observers, to suppose that they commence by one or two conical branches, and that they arise from the vessels of the mucous layer, it is not certain that in many cases only a single lacteal, which has a conical and frequently enlarged end, and whose diameter is much greater than that of the capillaries, traverses the villus. It is in all instances true that the villi have a filiform or cylindrical and filiform villi will be found to present this condition, but that, on the other hand, the number and mode of origin of the lacteals may possibly be different in the broad and foliaceous forms.

In addition to the villi, the organ also contains, as Brücke discovered a short time ago, a thin layer of longitudinal smooth muscles, situated more centrally round the lacteals; these however are not always distinct in man, they produce contractions of the villi, which are very evident immediately before or after death, and are produced by the small lacteals, or vessels external to the villi, in the living animal. They have in all probability an important influence over the propulsion of the chyle, and of the venous blood in the villi—always supposing that there is no object to the villi, that is, that the villi are not the place for the performance of any digestive contractions during life. Nothing is known about the nervous system to the villi. The epithelium of the villi and of the rest of the surface of the mucous membrane, although it is very intimately united with the deeper-seated parts during life, only becomes detached by the few external fluids, and may only be found in the dead subject, and can only be observed in perfectly fresh portions of the intestine. It consists everywhere of a simple layer of cylindrical cells slightly narrowed below of 0'015°—0'012° in length and 0'004° in breadth, whose contents are usually nothing but fat granules, and an oval, clear, vesicular nucleus, provided with one or two nucleoli. During life, these cells, which agree in all their chemical characters with the deeper cells of the oral epithelium, are so intimately united, that even in the best preparations of epithelium, as yet seen, they either not at all or only indistinctly distinguishable, though on the surface they have the appearance of a beautiful mosaic. The cylinders only become quite distinct when they are either spontaneously or artificially detached, and may then be observed in the same manner that they hang together in continuous portions, all the cells covering a villus sometimes coming off together like the epilayer of a moss.

The addition of water to these cells produces a separation of the cell contents from the broad end, giving rise, in separate cells, to the appearance of a membrane thickened upon one side, and, in series of cells or entire villi, to that of a peculiar structureless coat, like the cuticle of plants; by its elongation, however, or by that of the intestine, the bursting of the cells produces apertures in them, or they become distended into large pyriform clear vesicles.

We may here refer to the changes which the epithelial cells and the villi in general undergo during digestion. The most striking circumstance is the occurrence of a fat-glomerulus in different parts of the villi, which may always be observed during the formation of a fatty milk-white chyle. The succession of the morphological steps is as follows: — The fat contained in the chyle at first enters only isolated epithelial cells, but finally the whole villus becomes filled with fat, and consequently bright and shining, with those which are empty and pale. In the end all the cells become filled with these drops, and the epithelium appears quite dark by transmitted, but whitish by reflected light, giving its aspect to the whole villus.
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digested at the extremities, though hardly ever dichotomously divided. The best idea of the number is obtained by viewing the mucous membrane either from above or in vertical section, under a low power. In the former case we see the cocca standing close together, almost like palisades, but in the latter they do not occupy the whole surface, but only the interstice between the villi; here however they exist in such numbers as to leave no intervale of any width, the mucous surface being all appearing pierced like a sieve. Even on Peyer's patches, as on the solitary follicle, these glands are to be met with; but in man they leave those portions of the mucous membrane which lie immediately over the crypts of villi free, and therefore are arranged like wings around them.

The length of the Lieberkühnian glands equals the thickness of the mucous membrane and varies from 3″—4″; their breadth is 0″289—0″036″, that of their aperture, 0″185—0″008″, composed of a delicate homogenous membrana propria, and of a. simple epithelium, which even during chylification never, like that of the intestine, contains fat; their cavity is filled during life by a clear fluid secretion, the so-called intestinal juice, which however becomes modified and thickened by contact with the foodstuff, so that the glands appear to be filled with cells, or with a granular mass.

The most important of the closed Follicles are Peyer's patches (glandulae aminativa). They are rounded flattened organs, invariably situated in the mucous membrane, which is opposite the mesentery; they are most distinct upon the inner surface, where they appear as rather depressed smooth spots, without any very sharp definition, but they are also recognisable from the exterior by the slight elevation to which they rise, by the more transparent or more opaque portions of the membrane. These patches are usually the most abundant in the ileum, but they are not uncommonly to be met with in the lower part of the jejunal to the duodenum, and even in the interior horizontal portion of the duodenum itself. Ordinarily there are 20 to 30 of them; but when they are found higher up there may be as many as 60 to 60, but they are always most closely set in the lowest portion of the ileum. The dimensions of the separate patches are in general the larger the closer they are to the cæcum; their length is usually 0″6—1″1, but may diminish to 0″5, and increase to 0″5—0″6, or even 0″1; their breadth from 0″3 to 0″5, or even 0″1. The villi of the valvulae conniventes are usually interrupted; in the jejunum however these folds are also to be met with upon the Peyer's patches and in the ileum; rows of closely-set villi often take their place. More minutely examined, every Peyer's patch is seen to consist of large villi of 0″3—0″5″ in diameter, either rounded or slightly conical towards the intestinal cavity, which lie partly in the mucous membrane itself, partly in the submucous tissue; and are on the one side not more than 0″05″ distant from the mucous surface, while on the other they are in immediate contact with the muscular tunic, which here somewhat more closely united with the mucous membrane.

Villi from the interior of the intestine their most striking feature is man is the presence of many small rounded depressions 0″4—0″5″ apart, which corresponds with the separate follicles, and whose floor is indeed rendered slightly convex by the latter, but which present no villi whatever. The remainder of the patch is occupied by common villi, or by resculated folds, and by the apertures of the Lieberkühnian glands; the latter are disposed around the slight elevations produced by the follicles in cicles of 6 to 10 and more apertures, the coruscular tubulum of stroma.

The structure of the follicles resembles the separate elements of Peyer's patches so closely in size, contents, and general structure, that there is no reason for considering them as distinct, particularly as the number of follicles is considerable in the small intestine of animals at least, we find Peyer's patches with 2—3—5 follicles. In man, as all writers justly agree, their number is excessively inconstant; sometimes not one can be found, whilst in other cases the whole intestines, as far as the mucus of the ileo-colic valve, is thickly beset with them; or, lastly, they may occur in the ileum and jejunum, but in no very great number. Their entire absence must probably be considered abnormal, since they are constant in newly born children, being more abundant in the jejunum than in the ileum. The solitary villous however, which are often met with in immense quantities in the small intestines and stomach in celiac affections of the alimentary tract, may very probably be entirely or partially pathological, since the occurrence of such cases has not been demonstrated in other organs also (in the liver according to Vorhöf). The solitary follicles have the same structure as the elements of the patch, only they occur also in the mesenteric border, and support villi upon their intestinal surface, which is usually somewhat convex.

Professor Kölliker expresses himself as decidedly opposed to the notion that the follicles of Peyer's patches have any apertures. Of their functions he says: They and the follicles of the jejunum in general seem to be nothing but glandular organs, analogous to the splenic follicles, the tonsils, and the lymphatic glands, which contain peculiar elements and a vascular network. In these a constant development of cells takes place, and at the same time substances are decomposed, and perhaps also from matters not of a fatty nature, absorbed from the intestine, a part of which in all probability is at
his uncoloured. Bodemaal.

Visits Stomach the sensation. Hydrous this. A are. was. This was a plain officer of artillery, Isabey had been on terms of friendship with him, and when the empire was founded Isabey continued in favour, and was appointed miniature-painter in ordinary to the emperor. In this capacity he accompanied Napoleon I, the emperor, the young king of Rome his son, the members of the Bonaparte family, and the favourite courtiers and generals. Among the most famous of the imperial pictures was a "portrait of a large slab of porcelain, representing Napoleon I and the most illustrious of his generals, and known as the 'Table des Maréchaux.' Besides the portraits, he executed several court and ceremonial pieces, one of which, a 'Visite de l'Empereur à la Manufacture d'Arbalâtre,' is a picture of the highest excellence, and quite admirably executed with the direction of works relative to the coronation of the emperor, when he was named officer of the Legion of Honour.

On the first abdication of Napoleon I, Isabey accompanied the empress Marie following her to Venice, where he painted a large tablet of 'One of the Conferences at the Congress of Vienna,' chiefly remarkable for the faithful likenesses of the numerous important personages assembled. On Napoleon's return from Elba, Isabey repaired to Paris, and propitiated the emperor by presenting him with a miniature of himself which he had just painted at Vienna. The restoration of the Bonbons brought no loss of fortune to Isabey; but a picture which he exhibited at the Salon in 1817 of 'A child playing with Flowers,' caused some 'sensation' among the Parisians, from the child, who was holding up a bunch of forget-me-nots, bearing a striking resemblance to the young Napoleon. The 'Constitutionnel' having ventured to make a pointed allusion to the likeness, received a warning from the police. Isabey soon after accepted an invitation to the court of St. Petersburg, where he painted the emperor Alexander, the empress, the grand-dukes Nicholas and Michael, and many of the magnates of the court. On his return to Paris he painted the portrait of Louis XVII., and as long as he continued to paint he found ample occupation; his sitters, it is said, having included most of the sovereigns, as well as a large proportion of the most distinguished personages, of Europe. Isabey survived till the 16th of April, 1856. He may be said to have formed a new school of miniature-painters in France. His likenesses have much character, and are generally esteemed faithful. His style is marked by force as well as delicacy, but almost necessarily from the numberless works he executed, also by a good deal of mannerism.

ISARIA, a genus of Fungi, belonging to the division Trichospororia, and the tribe Iaresis of Lévêlile. It is characterized by a compound, solid, capitulated, or elongated receptacle. The species are found parasitic upon caterpillars and the larvae of various insects. Rohin enumerates the following species:

1. Eleuteroborus has been found upon the Carabidae in the autumn of the year.
2. Fascites, upon the larvae and chrysalides of Bombus Jacobea.
3. Strigosus, upon the chrysalides of Notus Upson.
4. Arachnomphus, upon small spiders belonging to the genus Geosora, in the autumn.
5. Leprosus, upon the chrysalides of Notus instabilis.
6. Tornaria, observed by Robin on an unknown spider, in the autumn.
7. Crossus, upon decaying chrysalides.
8. Lychnus, upon a dead hornet.
9. Elycela, upon the larvae of a moth.
10. Araneaceus, an American species, found on spiders in Carolina.
11. Pneumonotus, also found in America, upon the caterpillars of the silk-worm moths.
12. Giganteus, found upon a Mygale in the island of Cuba.
ISATIC ACID. [CHEMISTRY, S. 2.]

ISATIN. [CHEMISTRY, S. 2.]

ISATYDE. [CHEMISTRY, S. 2.]

ISERINE. [TITANIUM.]

ISEWORTH. [MIDDLESEX.]

ISMAIL, a strongly fortified town of Turkey, in the province of Silistria, is situated on the left bank of the northern or Killia arm of the Danube, 20 miles east from the mouth of the Pruth, and about double that distance from the Black Sea, in 40° 21' N. lat., 28° 50'E. long., and has about 20,000 inhabitants. It was taken by storm by the Russians under Suwaroff, Dec. 29, 1790, when the Turkish garrison numbering 30,000 men were put to the sword; the Russians lost 20,000. Under the Turks Ismail was important, not only in a military but in a commercial point of view; it contained 17 mosques, a large number of khans and bazaars, and many splendid houses. On its capture by the Russians all was put to fire and sword, and the town remained in a ruinous condition till 1812, when it was ceded to Russia by the treaty of Bukharest. Since then it has been rebuilt, and now contains about 2500 houses and 12 churches. The Killia arm of the Danube is navigable for steamers and for vessels of considerable burden, of which about 150 enter the harbour of Ismail annually, and are chiefly engaged in the corn trade. There are remains of a fine Turkish palace in the town.

Ismail is now chiefly of importance in a military point of view, and the Russians rendered its defences very strong. It was restored to Turkey after the late war in the Crimea, by the new adjustment of boundary consequent on the treaty of Paris of 1856.

ISONANDRA, a genus of Plants belonging to the natural order Spermatoz. It is distinguished by the stamens being all fertile, and twice as numerous as the lobes of the corolla.

J. Gutta (Hooker), the Gutta-Percha Tree, has its leaves on long stalks, obovate-oblong, with a short point golden beneath; flowers axillary, fascicled; stamens 12. This tree is a native of the Malayan Archipelago.

The substance yielded by this tree, and designated by the name of Gutta-Percha (pronounced ' Pertaha') is, like Caoutchouc, a carburet of hydrogen, and isomerous with that substance, and possesses a great number of the properties which characterise India-Rubber [Caoutchouc], but exhibits certain special properties which admit of its being applied to particular uses to which caoutchouc is not adapted. Gutta-Percha possesses as great an indestructibility by means of chemical agents as caoutchouc. It has an intermediate consistence between that of leather and wood; it is capable of being softened by heat, and of regaining its primitive consistence on cooling. It is therefore at the same time capable of taking and of retaining the most delicate impressions. The important uses to which it has been lately applied are only the forerunners of those to which it will be adapted hereafter, a scarcity of this precious material (which unfortunately is produced in much less quantities than India-Rubber, and in localities much more circumscribed) does not present an obstacle to it.

Whilst the plants which furnish caoutchouc abound in the whole of the territorial zone which extends between the tropics, the Isonandra Gutta is the only tree which yields Gutta-Percha. It grows scarcely anywhere except in certain parts of the Malayan Archipelago, and up to the present time has been almost exclusively obtained from Singapore. It was brought for the first time into England in the days of Tradescant, as a curious product, under the name of Musar-
JACK, a common name of the Fresh-Water Pike. [Esox, S. L.]

JACOB'S LADDER. [Polemonium, S. 1.]

JAMAICA. [Chemistry, S. 2.]

JANIPHA, a genus of Plants belonging to the natural order Liliaceae. It has a glabrous, oblong, acuminate, 5-parted; petals wanting; stamens 10 in the male flowers; filaments unequal, distinct, arranged round a disc. In the female flowers the style is scabrous; stigmas 3, consolidated into a rosy mass; capsule 3-coccos.

J. Manelot (Jatrophca Manelot of Linnena) is a native of Brazil. It has an oblong tuberous root, as big as a child's hand, full of a wheyish, venomous juice. The stems are white, brittle, having a very large pith, and several knobs standing out on every side like warts, being the remains of the foot-stalks of the leaves, which have dropped off, usually 6 to 7 feet high, with a smooth white bark; branches crooked, and have on every side near their tops leaves irregularly placed on long terete pedicels, broadly-cordate in their outline, divided nearly to their base into spreading lanceolate entire segments, alternate at both extremities, dark-green above, pale-green beneath; the midrib strong, prominent below, and there yellowish-red; from it there branch off several oblique veins, connected by lesser transverse ones; stipes and pedicels short, thick, brown; filaments, or compound racemes, axillar, and terminal, 4 to 6 inches long, bearing sometimes all male or female flowers, at other times these are mixed on the same peduncle; pedicels with small subulate bases. Male flowers smaller than the female. Calyx purple, on the outside, fulvous-brown within, cut out half-way down into five spreading segments; disc orange-coloured, fleshy, annular, 10-rayed; stamens 10, alternate with the lobes of the disc; filaments shorter than the segments yellow, or brown; stigma 3, reflexed, furred and plaited, white; capsule ovate, 3-cornered, 3-coccos; seeds elliptical, brown, shining, with a thick fleshy funiculus. The expressed juice is dangerously poisonous. Felons of the root harmless when separated from the juice and exposed to heat. It is called Cassava. Cassava, the principal article of diet in South America. The nutritious substance known as Tapioca is the Cassava differently prepared and granulated. These preparations are obtained by scratching the roots after the bark has been removed and straining off the water, when the mass is gradually dried in pans over the fire.

JARROW. [Dorham.]

JASMINUM, a genus of Plants belonging to the natural order Oleaceae. It has a tubular 6 or 8-lobed calyx; a 6 or 8-parted corolla; stigmas 2-lobed or bifid; berry dry, globose, having one of the lobes usually abortive; seeds without albumen. The species are usually twining shrubs. Leaves simple or compound; petioles articulate; flowers white or yellow.

J. Sandea, Single-Flowered Arabian Jasmine, is a twining plant; the leaves almost sessile, membranous, from cordate to oblong, acute or obtuse, glabrous; berries globular; branches, petioles, and peduncles downy. It is a native of the East Indies. The flowers generally form small trichomes, umbel-like, without fragrance. The berries are black. A perfume, known as Oile of Jasmine, is obtained from this plant.

J. angustifolium, Narrow-Leaved Jasmine, is a native of the American coast. It is a twining bright plant, with ovate leaves, and a shining deep-green colour. The flowers are large, white, with a slight tinge of red, star-shaped, having a peculiar but very pleasing fragrance. The bitter root of this species, ground small and mixed with honey, is used in India as a valuable external application in cases of ringworm. The plant being constantly covered with leaves of a bright deep-green, sometimes as small as those of Box, render it always beautiful, and well adapted for screening windows and covering arbours in warm climates.

J. officinale, Common Jasmine, is a native of the South of Europe. It has opposite leaves, pinnate; leaves ovate-acuminata; buda eroticum. The plant is glabrous, the branches angular. Calycine segments 6, subulate; corolla white, 4 or 5-cleft, sweet-scented; the terminal leaflet is the largest. The Common Jasmine has been a favourite plant in the Indies, not only for the sake of its perfume, but also because of its beauty; as well as the date of its introduction, are unknown. Gerard in 1597 says it was in common use for covering arbours. There are golden and silver-edged leaved varieties of the Common Jasmine, as well as a double-flowered variety.

J. grandiflorum has opposite pinnate leaves, leaflets bluntish, the outer ones 3 to 6-confluent, buds horizontal. It is a native of the East Indies, and greatly resembles J. officinale, except in the size of the leaflets, and in the exterior ones being confluent, and the flowers larger and reddish underneath. Both this and the former species yield the true essential oil of jasmine of the shops.

The leaves of J. undulatum are slightly bitter. The root of J. succulentus is thought to be elecctric.

JATROPHA, a genus of Plants belonging to the natural order Euphorbiaceae. It has monocious flowers; 4-parted or lobed calyx; corolla 5-parted or absent; stamens 8 or 10, with unequal mounadelpus filaments; styles 5, bifid or capitate; fruit in the shape of a capsule; seeds with a thick yellow rind.

J. Carcusa, Physic-Nun, is a very common small tree, bush, or coast of Coromandel. The bark is smooth and light ash-coloured; leaves scattered, stalked, broad, cordate, 9-angled, smooth, about 6 inches each way; petals rounded, smooth, 4 to 6 inches long: stigmas abortive; panicles terminal or from the exterior axils, bearing many small yellow flowers. The male flowers at the extremities of the ramifications on short articulated pedicels, and the female flowers in their axils, on thick fleshy pedicels. Bracts, a small one below each subdivision of the panicle, and generally one pressing on the calyx; calyx 5-lobed; corolla 5-petalled, campanulate, somewhat hairy; disc of 5 glandular bodies round the base of the filaments; filaments 6, the central one very thick, columnar, the 5 posterior ones filiform towards the base, adhering to the central one, all erect, and a little longer than the calyx; anthers 10, sagittate, equal; 5 supported by the large general filament, and 1 by each of the others. The leaves are rubefacient irritated; warm and rubbed with castor-oil, they are applied by the natives of India as poultices. The seeds are violently emetic and dractic; their expressed oil is reckoned a good application in itch and herpes, and also, a little diluted, in rheumatism. The juice of the seed is an excellent in the case of wounds; healing: it dyes linen black. The oil, boiled with oxide of iron, forms a varnish used by the Chinese for covering boxes. In large doses the seeds are emetic poisons.

J. glauca is found in Arabia Felix. It has leaves from 3-lobed, macronate serrate, toothed; petals naked; stig- pules palmate, with sessile or branched divisions, glindar at the apex. The seeds yield a stimulating oil recommended by the Hindoos as an external application in cases of rheumatic and paralytic affections.

J. glandulifera is a native of the East Indies. The leaves about the extremities of the branches are alternate, petiolated, and generally palmate; the lobes from 3 to 6, oblong, serrate, with each serrature ending in a short green glandular-beaded bristle; stigmas bristly, many-cleft, each division ending in a glandular head; panicles terminal, about as long as the leaves. Male flowers most numerous and terminal, small, of a pale yellowish-green colour. The female flowers few, and sessile in the divisions of the panicle. The pale yellowish, or whey-coloured juice is one of the most fresh and most popular as a medicine is employed by the Hindoos as an escharotic to remove films from the eyes.

J. multifida is a native of tropical America. It has palmate the 11-lobed, macronate serrate, toothed; petioles naked; stig- pules sessate, multifid; flowers corymbose, scarlet, with coloured pedicels. The seeds are one of the best of all emetics and purgatives, acting briskly, but without inconvenience; their effects are readily stayed by the administration of a glass of good white wine.
J. Marsh is now referred to the gena Jäniska. [Janu-
ary, S. 2.]

JAY, REV. WILLIAM, was born on the 8th of May
1769 at Tisbury, Wilts. His father, who was the son
of a small farmer, worked as a stone-cutter and mason, and
young Jay's first employment was that of a mason's boy.
While he was at school, under the tuition of Mr. Cornelin
Winter of Marlborough Academy, an institution
connected with the Congregational body, in which young men
were trained for the ministry. His abilities soon became
known, and he was placed in the Greek class at the age of
sixteen.

For about a year he officiated as the minister of
Lady Maxwell's Chapel at the Hotwalls, Clifton; and on
January 31st, 1791, he was settled as pastor of the church
assembling in Argyle Chapel, Bath, a position which he main-
tained for a period of six years. Mr. Jay retired from
the pastorate in January 1833, and died on the
27th of December in the same year, at the age of eighty-four.

His reputation as a preacher was very high, and was by no
means confined to his denomination, that of the Fede-
pedents. His published sermons have had extensive
circulation, and many a congregation throughout the kingdom
has often listened to Jay's sermons without knowing to whom
they were primarily indebted for the instruction they were
receieved. He became piece of pastor and his labours were
also in the family, and so well adapted for reproduction in
other pulpits, was their simplicity of style, combined with a
clear and methodical statement of the lessons sought to be
conveyed. The effect of his own ministrations was much
enhanced by his manner of delivery, a full command of his
pleasing vocal powers. Mr. Jay's regular con-
gregation was large, and visitors to Bath usually repaired
to his chapel to hear him preach. He generally made an annual
visit to London, and to the coast, where he delivered his ser-
mons elsewhere he attracted crowded congregations. When he
had completed fifty years of his ministerial labours his people
held jubilee services, in connection with which, at a public
breakfast in the Assembly Rooms on the 2nd of February
1839, an edition of music, consisting of 350 copies, were
presented to Mr. Jay. Besides his sermons, of which
several editions have been published, Mr. Jay wrote an
'Essay on Marriage'; 'Memoirs of the Rev. Cornelius Win-
ter'; 'Memoirs of the Rev. John Clark'; 'Lectures on
Female Scripture Characters' (published since his death);
and an 'Autobiography', from which and other sources a
memor of Mr. Jay was prepared by the Rev. Dr. Redford
and the Rev. J. A. James, and published in 1844. A uniform
edition of Mr. Jay's works was published under the author's
superintendence in 1845-49 in twelve volumes, post octavo.

JEFFREY, FRANCIS, was born in Edinburgh, on the
3rd of October 1775, in the upper part of a house now
marked No. 7, Charles-street, George-square. His father,
George Jeffrey, was one of the deputy sheriffs of the
City of Edinburgh; his mother, Henrietta Loudoun, was the
daughter of a Lanarkshire farmer. They had a rather numerous
family, Francis being the eldest son, though not the eldest
child. At the age of three he was sent to the High School
of Edinburgh, where he was for four years under the care of one
of the under-masters, Mr. Luke Fraser—a worthy man, whose
celebrity depends on his having, in three successive classes,
three pupils no less famous than Walter Scott, Jeffrey, and
Brougham. Jeffrey's classical attainments were, while he was under Mr.
Fraser, used afterwards to remember him as "a little clever,
auxious boy, always near the top of his class, and who never
lost a place without shedding tears." From Fraser's class, he passed, in regular course, in the year 1791 to that of the
reverend Dr. Adam Smith, who was the author of the" system of
society" and noted alike for his scholarship and the simple integrity of his
character. Jeffrey, as well as Scott, used afterwards to speak
with the highest respect of this old good man. It was in
the winter of 1786-7, while still attending Dr. Adam's
class, that Jeffrey, then a boy in his fourteenth year, and
post Burne. He was walking along the High Street, when he
was attracted by the appearance of a man on the pavement,
who, as he passed, was so much in manner, seemed to be from
the country, but in whose face was something
uncommon. It was Burns, then on his first visit to Edin-
burgh; and as "the little black fellow was gazing at him,
one standing at a'shop-door near said to him "Ay, laud's ye no look at that man; that's Robert
Burns!" " Jeffrey never saw Burns again; but he used to
dwell with pleasure on the incident.

In the winter of 1787, Jeffrey (his mother being then just
dead) was sent to the University of Glasgow; his father
for some reason or other preferring that university to the
University of Edinburgh. Here he attended the Greek
classes under Young, the logic class under Jardine (then recently
appointed, but already with something of that reputation as a
teacher which he afterwards maintained and increased),
and the economy class under the Rev. Dr. Arthur, the successor of the philosopher Reid. That he did
not also attend the law class, though taught by the able
and eloquent Miliar, is accounted for by the fact that his
father's opposition to the study of law was continued to the
same time as that of his eldest brother, and Jeffrey, like
tory, and likely to regard the teaching of a Whig like Milar
with suspicion. Jeffrey's class-fellows at Glasgow remem-
bered him afterwards as being there one of the cleverest
of the younger students, somewhat 'petulant' in his manners,
and 'melancholy' in his disposition. Mr. Jeffrey was
in his winter on his upper lip in spite of remonstrance
and ridicule. It was in the debating societies of the college
however that he first broke on his companions of that day in
the full display of his superiority. He was a fluent
and rapid speaker, a ready and ingenious writer, and
a merciless critic of the essays and opinions of others. It was
at this time also that he commenced the habit of reading and
versatile reading, and of noting-taking and essay-writing for
his own improvement in the performance of his duties.
On the 7th of January 1789, Jeffrey was accorded the great
ammonition after his removal from Glasgow back to Edin-
burgh in the year 1789. In his little room in his father's
house in the Lawmarket, he read and wrote continuously,
filling quires of manuscript with notes and abstracts from
books, and was concerned in a part in the editing of the Speculative.
Jeffery's friend Lord Cockburn gives a list of 31 different manuscript
essays on literary and metaphysical topics, all written by him
between November 1789 and March 1790. About the same
time he attended the first session of the University of Edinburgh.
In 1791 he went to Queen's College, Oxford, intending to complete his studies there.

While at Oxford he was very solitary and melancholy; he
disliked the place; and after nine months was overjoyed to see
his sister, Johna, and his friend during his stay at Oxford, "I see nothing that it
is possible to acquire in this place." On his return to Edin-
bwich, in July, 1792, his friends found that his stay at Oxford
had altered him in at least one thing: he now as long
spoken in his former natural Scotch accent, but in a sharp
and, as some thought it, an affected English style of pron-
cunciation. "Jeffery," Lord Holland used afterwards to say," had lost his broad Scotch at Oxford, but he had gained
only the narrow English." Very soon however his friend,
who knew his real intellectual force and the genius
good of his heart, became reconciled to his new style of speech;
and Lord Cockburn certifies that to his latest years, Jeffrey
had never really forgotten his native Doric, but could talk
brother Scots and Galwegian, as the habit of the countrymen
when he chose. He had a strong relish, too, for
Scottish anecdotes and humour. For a while after his
return from Oxford, it seemed uncertain whether he might
not be called upon by his father to give up the law;
but he came a merchant; but the legal profession was not
extinct

On the 19th of December 1792 he became a member of the famous
Spectaculat Society, then at the height of its fame; and then
he first formed the acquaintance of Scott and many other
young men of the day. This distinction as lawyers, literary men, and statesmen.
For several
years Jeffrey was one of the oraments of this society, reading
essays in his turn, and figuring with peculiar eclat in almost
every debated subject. In 1793, he was made a fellow of
Jeffery, Coll. of Honour and Benefactors; a set that in their
most glorious days did they speak better than they did
when young members of the Spectaculat. Already in these
 debates, Jeffrey, despite the Toryism of his father, was a
Whig at heart; he never consulted his father's wishes, while he
continued his habits of various thorough devoutly reading, and of incessant
composition in private on all sorts of subjects.
He had even a dream at this time that he was
born to be a poet; and he wrote, his biographer tells
of this great dream, says, from inspection, that though "viewed as mere literary practice
it is rather respectable," it could never have been accepted
as poetry. He adds that in one constitutional quality of the poet, Jeffrey was certainly highly endowed—the love of excitement. His work, according to Jeffrey, was in his earlier years, uniformly uphilt. It is significant of theperation of writing for the Edinburgh Review and political, to the purposes of rapid immediate effect, that, when a selection of his essays from the Edinburgh Review was published in four volumes in 1843, the work did not make much noise, and none of them were formally condemned, according to the similar collections of the essays of Macaulay, Sidney Smith, Carlyle, and others.

To return to Jeffrey's life, apart from the 'Review,' his professional practice rapidly increased, as his powers as a lawyer and orator were recognized; and it was found that he was not without a rival at the Scottish bar—combining good knowledge of law with singular perspicacity and ingenuity, and a rapid, fluent, and brilliant style of eloquence. He died, as a speaker in a libel case, where he was conducting the prosecution, after listening to his torrent of words, declared that, by calculation with his watch, 'that man had actually spoken the English language twice over in three hours.' Jeffrey's triumphs as a pleader in criminal and civil cases, were numerous; but nowhere was he more successful, or more in his element, than at the bar of the General Assembly of the Scottish Church, at its annual meetings in May, where he was usually retained in important ecclesiastical cases. With the increase of his practice there was a corresponding increase in his income. It is also of importance to note that he was a successful man professionally at Edinburgh, and Jeffrey were all afterwards the best of friends; and both the duel and the satire were laughed over among them. With Scott also, notwithstanding that their original political differences, were the cause of Jeffrey's resignation from the Edinburgh Review to aid in founding the Quarterly in 1809, Jeffrey always remained on terms of personal friendship; and nowhere were Scott's novels more cordially welcomed and praised than in the Edinburgh. At length, after remaining a widower eight years, Jeffrey married again. His second wife was an American lady, Miss Charlotte Wilkes, the daughter of Mr. Charles Wilkes of New York, and the grand-niece of Wilkes the notorious politician. He had met this lady during a visit of her family to Britain; but here they were parted for many years, until his return to America in 1813. During his brief stay in America, he saw some of the most important men in the United States, and formed an acquaintance with American society and literature, and with American literature. He had also been aided for some time in the new town of Edinburgh; but ultimately he removed to Craigcrook, a beautiful little property at the foot of the Corstorphine Hills, about two miles from Edinburgh, the old tarnished mansion of which, and the wooded grounds, were much improved by him in subsequent years. The vicinity of the place to Edinburgh made it perfectly convenient for his professional engagements; and till the time of his death he here received as his guests his professional and other friends, and all strangers of distinction who visited Edinburgh. The elegant hospitality of Craigcrook were proverbial; and the house and grounds retained their associations with Jeffrey, as Abbotford is associated with the name of Scott. Here Moore sang his songs under the roof of his former adversary, and here he remained till his death. Dickens formed that acquaintance with the venerable critic which ripened into so strong a friendship.

In the year 1821, Jeffrey was elected Lord Rector of the University of Glasgow. Whig politics were by this time in the ascendant in Scotland, and Jeffrey, as the Whig leader, took his part in the public meetings and other demonstrations which heralded the approach of the era of Reform. Having been chosen Dean of the Faculty of Advocates in 1829, he retired from the seat of his former rivalry, and here he remained till his death. The Edinburgh Review, which accordingly he resigned into the hands of Mr. Napier. He still took an interest in the Review, however, and at a considerably later period, when his son-in-law, Mr. Empson, succeeded Mr. Napier as editor, it was his delight to revise proofs and correct articles, as his son-in-law's deputy. In the meantime however he had passed
through new phases of his life. In 1830 he was elected a member of the first parliament of William IV., being returned for the borough of Douglas. In March 1831 he was unseated on petition, but was immediately returned again by Earl Fitzwilliam for the borough of Malton. He represented this borough till 1835, taking part in all the Reform debates; and in the end of that year he was returned for the borough of Edinburgh, along with Mr. Abercromby, the speaker (now Lord Donfermline). He remained in parliament till 1834, and was Lord Advocate of Scotland under the Grey government. His parliamentary speeches however did not attract much attention; it had been formed from his fame as a critic and a forensic orator; and he seems himself to have welcomed the change when, in 1834, he was raised to a vacant judgeship on the Scottish bench, and so relieved from the cares of political life. He had the reputation of an able judge, and hence Jeffrey was thereafter designated as Lord Jeffrey, though still legally only Francis Jeffrey, Esq. As a judge, he had a very high reputation for soundness, conscientiousness, and rapidity. He was noted for a habit of interrupting pleaders when they wandered, so as to bring them back to the point; and so long as he was in the second division more business was sent before him than before any other judge. He continued in the discharge of his duty almost to the last, dying at Edinburgh on the 27th of December 1850, he was buried at Craigcrook, on the 20th of January 1850. In the relotions of private life, Lord Jeffrey was a singularly affectionate and amiable man, soft-hearted to a degree which surprised those who, till they saw him, had figured him only as a sharp and severe critic. The best impression of this remarkable man is to be gathered from the selections from his correspondence published by his friend Lord Cockburn, as an appendix to his Biography, in 1852.

For his genius, the works of Professor J. S. Mill, belonging to the faculty of Logic and Ethics, established by Mr. Alder, and named after Mr. J. S. Mill, are to be referred to Rasselas. Forbes and Hanley give two species, J. d. sp. and J. d. sp., as inhabiting British seas.

...
JOHNSTON, JAMES F. W., late Professor of Chemistry in the University of Durham. He was born at Paisley, about the year 1796. His father subsequently moved to Manstone, Connecticut, afterwards returning again to England, and residing at Kilmarnock. During this time the education of young Johnston depended chiefly on his own efforts; he was however so successful that he was enabled to obtain his own livelihood by giving private instruction to pupils in the University of Glasgow. In 1835 he removed to Durham, where he opened a school. In 1830 he married the daughter of Thomas Ruddy, Esq., of Park-end. By this marriage his circumstances were so much improved that he gave up his scientific pursuits for a time, and remained as a farmer, long conceived of devoting himself to the study of chemistry. He accordingly repaired to Sweden, and became a pupil of the celebrated Berzelius. He made so much progress in his chemical studies, and became so well known as a chemist, that in 1846, Mr. Johnstone, the University of Durham, was invited to take the readership in chemistry and mineralogy. This took place in 1833, whilst he was yet pursuing his studies on the Continent, and the chair was not occupied till he returned to fill it. On his return, he took up his residence at Edinburgh, and devoting himself to the department of agricultural chemistry he became appointed chemist to the Agricultural Society of Scotland. On the dissolution of this society, he left Edinburgh, and resided permanently in Durham, where he devoted himself to the production of works on the relation of ch-short to agriculture. In this he was very successful, and few writers have been more extensively read in this department of literature. His Lectures on Agricultural Chemistry and Geology are an able exposition of the principles of chemical and geological science to the art of agriculture. He also published a 'Catechism' on the same subject, which at the time of his death, in 1855, had gone through thirty-three editions, and translated into almost every European language. He had travelled in America, and was well known as an agricultural chemist in the New World; and his works have there as large a circulation as in his own country. His experience of America he gave to the world in 'Narratives of Travels in North America,' in which he discusses many of the important agricultural questions connected with the resources of that great country. He was an eminent popular writer and teacher, and all his writings exhibit an enthusiasm which renders them attractive even to the unscientific reader. One of the most popular and the last of his works was his 'Chemistry of Common Life,' which has had a vast circulation, and done much for diffusing knowledge of the principles of chemistry involved in the ordinary occupations of human existence. A few years before his death he had written a 'Manual of Chemistry,' which was published in 1855. In the year 1843; in Travelling on the Continent in his natal health, when he was suddenly seized with spitting of blood, which terminated in a rapid decline, and he died at Durham on the 18th of December of that year. He was made a Fellow of the Royal Society in 1827, and was a member of other learned societies.

JOINT-STOCK COMPANIES. The great alteration in the principles which have influenced modern legislation with reference to Joint-Stock Companies calls for some repetition of what has been already stated with reference to them. [Bank, Banker, Banking Partnership] These Companies are distinguished from other Corporations by being associated, not for any public or administrative purposes, but for the purpose of carrying on a trade, with a view to individual profit. They possess other peculiarities equally deserving of notice. This system of association, which has received such gigantic development in the last century, was for a time widely known. and, of recent origin. Institutions founded on the same principle as the trading guilds of the middle ages seem to have existed among the Saxons; and soon after the conquest we find companies of different trades established in the various seaports and other towns of importance in the kils, or companies, other trading associations sprung up from time to time. The general company of Germans, called also the Merchants of the House, dates from 1290, and became in the fifteenth century the Company of the Steelyard. In 1658 the 'Merchants Adventurers' for the Company of the 'Merchants Adventurers to the Netherland,' obtained a charter of incorporation, prohibiting the former from interfering with them, and the Steelyard Company seems thereafter to have gradually declined. This Company established the merchants adventurers for the discovery of lands in America, the &c. &c., before known by the English, which resulted in the establishment of a trade with Russia. This Company subsequently obtained several Acts of Parliament, and still elects its officers. The Turkey Company, the African Company, the Eastland Company, the East India Company, were all chartered monopolies; but the Hudson's Bay Company alone remains on this ancient footing. Soon after the Revolution, the principle of association began to be applied to a variety of purposes besides those of foreign adventure. Numerous projects were started, the execution of which could not be compassed by private means, but which it was thought might be attained by raising capital on the joint-stock principle. Hence arose, in the early part of the eighteenth century, the speculative mania, remembered in connection with the famous South Sea Company; of which we have seen counterparts more than once in our own times. To meet the evils occasioned by this speculative mania, the 'Bubble Act' (6 Geo. 1, c. 18), was passed, declaring all companies which pretended to act as corporate bodies, and to pretend to raise transferable stock, public nuisances, and the promoters of them punishable accordingly. This statute, intended as a sop to quiet all who proposed schemes as a Corporation without authority, as with a view to prevent the frauds of unprincipled adventurers, who propounded schemes merely as basins to extract money out of the pockets of the thoughtless. Such an object, however, is not to be effected
by mere legislation. The gambling in stocks and shares which seems to be periodically revived among us, and which, in 1719, produced the 'Bubble Act,' came to an end during the crash following the wild speculation which led to the statute; but the Act, nevertheless, had some effect in restraining the desire of speculators for projects of the character to those against which its provisions were directed.

During the last century a large number of useful public undertakings, such as the making of canals, bridges, harbours, docks, and the like, have been carried into effect by companies. These joint-stock companies, which were first incorporated by Acts of Parliament; and more recently our gigantic system of intercommunication by railway has been obtained in a similar way. In these undertakings, the appearance of the joint-stock company was not so much to give a corporate existence to an association of capitalists, as to enable the company to carry out its project by the compulsory purchase of property, and to make by-laws binding on the public for protecting the rights of the corporation. These companies, like the old trading associations, partake of the advantages derived from incorporation; advantages in which mere associations of individuals joined together to promote such common objects cannot possibly participate. A mere assembly of adventurers cannot, for instance, by any agreement among themselves, or individually, give the name of any one of their body, or of any officer they may select for the purpose; they are liable, on the contrary, to the same laws as ordinary partnerships, and each individual is made liable for his own debts without limitation and omission of the contracts and debts, of the body generally. To facilitate the operations of such associations, various statutes have been passed; but owing to the fluctuation in opinion regarding the true policy to be pursued, the legislation relating to them has been rather confused.

The original mode of forming a joint-stock company was by means of a deed of settlement, which constituted trustees of the partnership property, directors of its affairs, and of its accounts, and other officers, defined the number of shares into which the capital was divided, and the form and mode of transferring them, and laid down rules for periodic meetings of the shareholders. In the absence of legislative interference, the rights and liabilities of the members of such bodies, in relation to the public, were the same as those of other members of ordinary partnerships; their rights and liabilities inter se depended on the provisions of the deed of settlement. The difficulties which were soon found to arise, in carrying on the business of such undertakings, induced the earlier joint-stock companies to obtain private Acts of Parliament, which usually enabled the company to sue and be sued in the name of the Secretary or some public officer appointed for the purpose, and almost invariably contained a clause whereby nothing could be done to incorporate the partnership; for one effect of incorporation would have been to destroy the individual responsibility of the members for the acts of the association, which the Legislature had, quite recently, most carefully retained. As joint-stock companies, however, in order to secure their usefulness, the cost and trouble necessary to obtain a private Act of Parliament were felt to be extremely burdensome; and the attention of Parliament being called to the subject, it was thought expedient by the Legislature to empower the Crown to grant to joint-stock companies such powers as were likely to be most useful to them, without, however, conferring all the incidents of a corporation. The first attempt at legislation in this direction was the statute 6 Geo. IV. c. 91, which enabled the Crown to incorporate them after to be granted, to provide that the members should be individually liable for the debts and engagements of the corporation. This Act proving ineffectual, another mode of proceeding was tried by 4 & 5 Will. IV. c. 94, which enabled the Crown to grant to joint-stock companies the privilege of suing and being sued in the name of any of their officers. This Act was soon repealed, and another attempt made in the same direction by 7 Will. IV. and 1 Vict. c. 72. The Act of 1840 was passed for the registration, incorporation, and regulation of all future joint-stock companies not requiring nor obtaining a charter or Act of Parliament. This statute introduced a system of public registration; and which the company became incorporated, for the purpose of carrying on banking or business for which it was formed, according to the provisions of its deed of settlement; but every shareholder remained liable individually for the debts and contracts of the company, and might be proceeded against as though he were not a member of the corporation. Banking companies were excepted from this statute, the 7 & 8 Vict. c. 113 being passed for their special regulation.

A great many joint-stock companies were formed, and by reason obtained the corporate privileges, which they were now enabled to do; but before long the affairs of several became involved; and the difficulties which thus presented themselves in attempting to adjust the rights and liabilities of the shareholders led to the Windig-up Act, 11 & 12 Vict. c. 45, and 12 & 13 Vict. c. 78, which several years exercised the acumen of the Judges of the Court of Chancery, in a series of hopeless attempts to interpret and follow out their provisions. The effect of the food of the Act was to give to the shareholders a very strong light upon the principles of legislation applicable to joint-stock companies; and the knowledge was purchased at an enormous expense, which has recently led to the repeal of the Registration and Windig-up Acts, and to a total remodelling of the law regarding these associations.

This has been effected by the statute 19 & 20 Vict. c. 47, which provides for the registration, under the provisions of these Acts, of all companies previously registered under the former statute. The Act itself has been amended by 26 & 27 Vict. c. 21.

The principle of limited liability, or the restriction of the responsibility of each member to the amount of the capital subscribed by him, which had long been conceded to partnerships, and corporations in the Staple, has been extended by the ordinary joint-stock companies. This statute contains a complete code for the effects to the commonwealth, has been at length extended to all joint-stock companies coming within the operation of these Acts, which choose to adopt their provisions, on the simple condition of obtaining registration and conforming to a few simple rules, whereby the personality of the companies is defined. From its operation are excepted all companies established by Act of Parliament, royal charter, or letters patent, all banking or insurance companies, and associations engaged in mining in the Stanniferous counties; companies with a limited liability may be formed conformably to certain local customs, which are generally known as the Cost-Book System.

There now exist, therefore, four classes of joint-stock companies.

1. Banking companies incorporated by special Acts of Parliament. This class includes railway, dock, harbour, and canal companies, many insurance companies, and a vast number of other bodies engaged in every species of profitable employment. Formerly each company thus incorporated was governed by the peculiar provisions of the Act which it obtained; but in order to introduce uniformity, a general Act, applying to all future companies, was passed under the title of 'The Companies' Clauses Consolidation Act,' 8 & 9 Vict. c. 25. This statute contains a complete code for the regulations of the proceedings, the transfer of the shares, and the general management of companies incorporated by Act of Parliament, 'The Lands' Clauses Consolidation Act,' 1840, was passed at the same time, consolidating all those provisions of earlier acts, and defines the special Act of any company, which required powers of acquiring land compulsorily for the purposes of the undertaking.

The peculiar character of railway undertakings rendered necessary 'The Railways' Clauses Consolidation Act,' 1845; which lays down regulations as to the construction of railway works, the amount and mode of enforcing the payment of tolls and fares, and the making of by-laws for the conduct of their business, which are binding upon all persons whatsoever.

2. A second class of joint-stock companies are the very few established under the statute 1 Vict. c. 73, or the proceeding Act, 6 Geo. IV. c. 91, which have been already referred to.

3. Banking companies formed since 1844 form a distinct class. They were until recently regulated by the statute 7 & 8 Vict. c. 113, but must now be registered under 'The Joint Stock Companies' Act, 1846.' This Act was nearly intended to limit the individual liability of the partners, and contains provisions for the company being wound up. Banking companies constituted previous to 1844, may avail themselves of the advantages of the statute, by being registered under its provisions.

4. The last class of trading corporations are the registered joint-stock companies, regulated by 'The Joint-Stock Companies' Acts, 1850 and 1867, under which seven or more
persons may, by subscribing a memorandum of association, and otherwise complying with the requisitions of the statute in respect of registration, form themselves into an incorporated company, with or without limited liability.

This registration is conditioned upon the subscriber or subscribers, or the registrar of joint-stock companies a memorandum of association, stating certain particulars in a prescribed form. Upon registration being effected, the subscribers, together with any person as from time to time shall by agreement of the company, become a body corporate, having a perpetual succession and a common seal, and power to hold lands to a certain extent, and with consent of the Board of Trade to any extent whatever.

The company hold itself forth to the public as one of those which the members are liable either with or without limit, according as the founders of it choose to adopt the principle of limited liability or not. Where the liability of the shareholders is limited, it is by the memorandum of association, the word 'limited' must be the last in the registered title of the company, and must be inseparably attached to its name.

The statute requires that a register of shareholders shall be kept; and that this list be annually revised, and a copy furnished to the registered joint-stock companies. This copy is open to public inspection, so that all the particulars of importance respecting the company can be at any time ascertained by persons dealing with it.

The affairs of a registered company are also liable to examination, and the Registrar of Companies is empowered to demand, and from time to time to examine into the accounts, and to make an inspection of the properties of the company, to see if the same are being properly managed, and if the company is being conducted according to its memorandum of association or the conditions in which it is or has been registered.

Any person is authorized to demand of the Registrar an order to inspect the books, accounts, and documents of any company, and the Registrar is bound to issue such an order on any application of a creditor, subscriber, or the like, provided he is satisfied that the same are not being properly managed, or are not being conducted according to the conditions in which the company is registered, or are not being conducted according to the conditions in which the company is registered.

The insolvency of the company is necessary to the dissolution of the company. The patent or deed of incorporation of the company must be surrendered to the registrar of companies, or to the court of probate, or to the court of exchequer, or to the court of chancery, as the case may be, whenever the company is dissolved.

The dissolution of the company is in all cases declared by the court of probate, the court of chancery, the court of exchequer, or the court of admiralty, according to the circumstances of the case. The court of probate is the court of first instance, and the court of chancery is the court of appeal, and the court of admiralty is the court of appeal in admiralty.

This species of company may be dissolved by being wound up, either voluntarily or compulsorily. A voluntary winding up may take place: 1. Whenever the period, if any, fixed for the duration of the company expires, or the event or accidents, on which it is to be dissolved; 2. Whenever the company has passed a special resolution requiring its winding up.

A company may be wound up compulsorily: 1. By virtue of a special resolution to that effect; 2. Whenever it does not commence business within a year after its incorporation, or suspends business for a year; 3. Whenever the shareholders are less than in number: 4. Whenever the company is unable to pay its debts: or, 5. Whenever three fourths of the capital have been lost or become unserviceable.

A company is to be deemed unable to pay its debts: 1. Whenever a creditor for 50l. has served a demand of payment, and the company has for three weeks neglected to pay or arrange or settle the claim; 2. Whenever the satisfaction of the creditor: and, 2. Whenever an execution is returned unsatisfied, in whole or in part.

The proceedings take place in the case of companies whose liability is unlimited, in the Court of Chancery; in the case of companies with limited liability in the Court of Bankruptcy. (Blackstone's 'Commentaries,' Mr. Kerr's edition, vol. i. p. 363.)

JOSEPH-ETTIENNE DE, was born in the hamlet of Jouy, near Versailles, in 1760. When only thirteen he accompanied the governor of French Guyana as sous-lieutenant to that colony, but remained there scarcely a year. He returned to Versailles, continued his education for two years, and then left France a second time for the French East Indian possessions as an officer in the Luxembourg regiment. In 1790 he was again in France, joined the revolutionary party, and rapidly attained military promotion, but during the war of the French Revolutionary Wars, which he spent in the Swiss canton of Schwyz. On Robespierre's fall in July 1794 he returned to Paris, was placed on the staff of the army of Paris under General Menou, and contributed to the triumph of the Convention in the streets of that city on the 21st of May (2nd French Consul) with the Second Battle of Paris, on the 5th of June, then released, and sent as commander to Lille; then again arrested on an accusation of being in communication with Lord Malmesbury the English minister, but acquitted and restored to his functions. Disgusted however with these repeated prosecutions he resolved to abandon his military career; he therefore solicited his discharge, which he obtained together with a pension for his good services and wounds. He was now thirty years old, and after a few months' service in the fleet of M. de La Veriere, and in 1797, was transferred to the 3rd Dragoons, in which gained him admission to the Academy in 1815. This was followed by several other operas, among which were 'Les Amazones,' with music by Meyeh, and 'Les Absences,' with music by Cherubini, which still retain possession of the stage. He has also written 'Sylva,' a comic opera, the reverse, with considerable success; and several tragedies, of which 'Syella' obtained a marked success. The work however on which his reputation mainly rests is 'L'Hermitte de la Chaussée d'Antin,' a series of essays on men and manners in France, which first appeared in the 'Gazette de France,' in 1813-14, and were afterwards collected and published in five volumes, 12mo, 1815. They were considered in France as the successful rivals of the English 'Spectators,' 'Guardsmen,' and 'Rambler,' though they doubt have considerable merit, the style is easy, the observation acute, the description animated, and the characters often drawn with much quiet humor. They may exhibit some resemblance to the essays of Addison or Steele, but none whatever to those of Johnson. They display a happy mingling of the serious and the comic, but they have little depth. Some attempts are made at the pathetic, but they are rather mandlin. They were however very successful in France, and the author followed up his success by the 'France Parlez,' 'L'Hermitte de la Guyane,' 'L'Hermitte de la Martinique,' series of novels, the last a collection by several writers, but all infinitely inferior to the first. 'L'Hermites en Prison,' however, and 'L'Hermites en Liberté,' written in 1823 and 1824, in conjunction with M. Jay, were of a better kind, and henceforth published under the patronage of the liberal party in France. M. Jouy has also written on political economy, and likewise two novels, 'Colli,' and 'Le Centenaire,' in 1827 and 1833. He edited for some time the 'Journal des Arts,' and he contributed innumerable articles to various newspapers and journals. He died at Paris in October 1846.

JUDICIAL COMMITTEE. The appellate jurisdiction of the Judicial Committee of the Privy Council has been already mentioned [Delattre, 'Court or, &c.'], It only extends to cases in which the courts of England, Ireland, and Scotland, or the courts of admiralty, and colonial causes, the Judicial Committee has been recently constituted the Court of Appeal from the judgments of the Court of Probate. It also decides upon applications for the admission of aliens to the patent books of the state, and the republication of books, which, after the death of the author, the proprietor of the copyright has refused to publish.

JUDICIAL SEPARATION. [Separation, Judicial, &c.]

JUDSON, ADONIRAM, founder of the American Baptist Mission in Birma, was born August 9, 1788, at Malden, Massachusetts, where his father was a Congregationalist minister. Having passed through the classes of Brown University, where he took honours, he entered the Andover Theological Seminary, and then, a year before, a sermon by Dr. Claudius Buchanan, which he chanced to meet with, turned his thoughts towards the missionary service in India. Some fellow-students, to whom he communicated his views, became similarly interested, and they eventually persuaded the college authorities their desire to devote themselves to the missionary office. There was then no missionary society in America, but the council referred the matter to a general committee, who resolved that it was advisable to institute a 'Board of Commissioners, with a view to the promotion and the republication of books, which, after the death of the author, the proprietor of the copyright has refused to publish.'

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Having on the 5th of February 1812 married Miss A. Hasseltine, he, twelve years after, embarked with his young wife for India. Four months later they landed at Calcutta,
where they met with a warm welcome from Dr. Carey and his wife. The next day the government, unaccustomed to having the blessing of a remunerated home missionary, ordered Judson and his companions to return to America by the same ship in which they had arrived. Judson had been appointed for a missionary work, and he was henceforth to be considered as such. He accordingly started on the 14th of April, 1813, and returned, as is recorded, to Rangoon, in Burma, where he arrived July 14, 1813.

Before leaving Calcutta, Mr. Judson, whose views on the subject of baptism had undergone a change, was, with his wife, re-baptised by immersion by Dr. Carey. In consequence of this change of opinion with regard to baptism, and when he returned to Rangoon to commence his missionary work he was unconnected with any society, and without any means of future support. He addressed himself however with success to some of the chief people of the country unaided by dictionary or grammar, whilst the native he engaged as a teacher knew not a word of English. By persevering labour he in some two or three years was able to speak the language with some degree of readiness. The Baptists of America, on hearing of his devotions, had promptly formed a missionary society to support him, and sent him some assistance, one of whom was a printer. The Samaritan missionaries presented a printing-press and a font of Birmese type. Mr. Judson, now not only engaged in preaching and teaching, but also in writing and translating, laboured to benefit those whom his voice could not reach, drew up in Birmese a 'Summary of Christian Doctrine,' which was the first work issued from the Rangoon press; and portions of scripture and sermons were translated as speedily as possible. As the mission was fairly at work Mr. Judson made visits to other Birmese towns, and to Ava, where he had an interview with the king; and, having obtained permission set about establishing schools, in which Mrs. Judson, who had also mastered the language, was a very great help. The mission was so successful that help was required from the British camp to mediate. A treaty of peace being signed, Mr. Judson and his companions were permitted to resume their labours. He returned to Rangoon; and, there, worn out with toil and anxiety, the companion of his early dangers and the sharer of his labours died, October 25, 1815, leaving his absence felt in Ava. Some eight years later he married a second wife, the widow of a fellow-missionary named Boardman.

From an early period Mr. Judson had regarded the translation of the Scriptures into Birmese as a work of the first importance in his life; and, after having been for several years engaged upon it, he at length, January 31st, 1834, had the happiness to complete his task. He lost no time in putting it to press; and, by the end of 1835, the printing was finished of the first edition, in 3 vols. laege 18vo. Each volume was divided into many sections, and the writings of the many imperfections, and he at once set about thoroughly revising the whole, with such assistance as he could obtain. This revision was completed in the autumn of 1840, and immediately printed in a thick 4to volume. It has since undergone careful correction by various Oriental scholars, and now holds a high place among the translations of the Scriptures into the eastern tongue. Almost as soon as the printing of this revised edition of the Bible was finished, with characteristic energy, Mr. Judson was engaged at Moulmein in the work of his country, and the mission was removed, the preparation of a Birmese Dictionary. But his own ill-health interrupted the work, and the health of his wife failing also, he determined to return to America, in the hope that their native air might restore their vigour. Mr. Judson died off St. Helena (September 27, 1852) while on his journey. He arrived in safety at Boston a month afterwards. His reception by the various religious societies in America was one of the most enthusiastic kind. Special services were everywhere got up in his honour; and the marriage of his second wife (a memoir of the first had already been written), was expressly arranged to accommodate young lady, Miss Chubbuck, whose writings under the pseudonym of Fanny Forrester, had had an unusually large amount of popularity in religious circles; and she was invited to attend the funeral of the life of the · very Worms, the dying Mrs. Judson, but soon consented to become the third. They were married in June, 1846; and in July they embarked at Boston, and in December they landed at Moulmein. The mission was now in a flourishing state, and Judson felt that he might now devote himself to the completion of his Dictionary. Of this he was permitted to see the first part printed in 1849, but he did not live to complete it. His health failed, and he was directed to proceed to the Isle of Bourbon to recruit his forces. But, growing worse, he was allowed to return to the 12th of April, 1852. His 'Birmese and English Dictionary' was completed from his papers by Mr. E. A. Stawens, and printed at Moulmein in 1852. It is regarded as a work of great value, and is a fact that it was written in a language spoken by more than a million people. His 'Birmese and English Dictionary' was completed from his papers by Mr. E. A. Stawens, and printed at Moulmein in 1852. It is regarded as a work of great value, and is a fact that it was written in a language spoken by more than a million people.
struggle with in devoting himself to his favourite pursuits. His example appears to have produced an effect on others of the family, for Antonin, a younger brother, became a physician, and entered the military service, and was eventually transferred to the schools of Bohemia in 1774, and Jungmann, though from his name he was evidently of German descent, and though, as his after life evinced, he had talents for acquiring languages, seems to have left his peculiar bardine the Bohemian language. He was still more distinguished by his celebrated attainments in the Bohemian language. He made it the main business of his after life to restore and promote the study and cultivation of the Bohemian language, which, in his boyhood, was almost abandoned to the use of the peasantry, and which, owing to its being treated as a secondary language of Bohemian authors, who were formerly accustomed to employ either German or Latin. He studied first at Beran, and then at the University of Prague; and in the year 1799 obtained an appointment as teacher in a Bohemian grammar school, of Leitmeritz, where he devoted part of his leisure to giving gratuitous instruction in Bohemian. While at Leitmeritz he translated several specimens of English poetry— Pope's "Eloisa," and "Messiah," and Dr. Johnson's "Edwin and Angelina;" Gray's "Elegy in a Country Churchyard;" and above all the "Paradise Lost," which was completed about 1804, but not published till 1811, and which came to a second edition in 1843, in the "Novocek's Bibliothek," where it was transferred to Prague as professor of Latin at the grammar school of the Old-Town, of which, in 1834, he became the prefect, or principal. In 1840 he was chosen rector of the university, an office which was delivered to him by his brother Jan. In 1842 he was transferred to a more important post, when his brother Jan had assumed the management of the gymnium, but he was still occupied with correcting works for the press at the time of his death, on the 18th of November 1847. He had for several years been an asylum, or in the native tongue. In 1845 the infancy of age compelled Josef to retire from the management of the gymnium, but he was still occupied with correcting works for the press at the time of his death, on the 18th of November 1847. He had for several years been and the ordinance of the Ministry of Education, and besides being decorated with the grand eagle of the Legion of Honour. He was likewise sent on several missions to the Court of Lisbon, his part of ambassador being suddenly changed at last into that of aggressor, when the good understanding between France and Portugal had ceased, in 1806. Junot then took forcible possession of Portugal, and held his ground there for nearly two years, when Sir Arthur Wellesley's victory at Vimiera, on the 21st of August 1808, and the evacuation of the city of Lisbon, brought an end to the occupation of Portugal by the French army, and Junot's return to Paris. He had already received his title as Duc d'Abrantes; but from this period he lost all favour with Napoleon, having no chief command to gratify his ambition. In 1812, the title of the Grand Army was assumed by the viceroy, and the 6th corps was ostensibly placed under his command, but the orders from Berthier were rather to his lieutenants than to himself, and the only time his name was mentioned in a bulletin, he was reflected upon as having shown "a want of resolution." Under this reproach his spirit sank; he was refused employment in the campaign of 1813, and shortly afterwards was attacked with mental disease. In this state he was conveyed to the house of his father, at Buzenans, on the 22nd of February 1816; the following day he threw himself out of a window, broke one of his thighs, and it became necessary to amputate the leg. He died on the 29th.

Laura Praxedis, Duchess d'Abrantes, was born at Montreal, November 6, 1784, and was only sixteen when married to Junot, in 1800. She was a woman of great frankness of speech, and equally remarkable for the propriety of her expenditure. As a consequence she made enemies at court, and during her husband's absence from France she obtained an annuity of 12,000 francs, which she was to use for the benefit of the poor. In 1811, Napoleon had turned the tide of his fortune, she had no savings to support herself and family. She therefore had recourse to her pen for her subsistence. She wrote many tales and novels, but her principal work was her Memoirs, which were written between 1798 and 1813. As these memoirs contained many incidents relating to the early life of the French emperor, its success was universal throughout Europe. The Duchesse d'Abrantes died in extreme poverty on the 27th of June 1839.
K

KAFFRARIA. [AFFRARIA]
KAFFRARIA, BRITISH. This name is applied to a dependency or military possession, recently annexed to the Cape Colony in South Africa. The annexation arose out of the Kaffir War of 1847. For twenty years before that date the settlers in the Albany district of the Cape Colony, being near the eastern frontier, were often exposed to invasions from the Kaffirs. Successive governors of the colony—Sir B. D'Urban, Sir P. Maitland, and Sir H. Pettinger—had endeavoured in vain to suppress these inroads. In 1847 Sir H. Pettinger sent a force to attack the Kaffirs himself; but his endeavours were successful only temporarily; the Kaffirs continued to be seated against the white settlers or lack out again with great force in 1850. On the last day of that year Sir H. Smith issued a proclamation from King William's Town establishing military law in the colony, and ordering all colonists between the ages of 16 and 20 to rise en masse to defend the frontier against the Kaffirs. The British troops suffered much annoyance and loss in the harassing bush-warfare which ensued. On the 8th November, 1851, in an encounter with the Kaffirs in the Waterloof, Lieutenant Colonel Fordyce and several officers and men of the 74th regiment were killed, and a considerable number wounded; the Kaffirs escaping unhurt. In January 1852 Major General Cathcart replaced Sir H. Smith. On the 20th December General Cathcart defeated the Basutos, a Kaffir tribe, on Berea Mountain in the Orange Sovereignty, shortly after which three chiefs named Macomo, Sandilli, and Krell submitted to the British, and the war was virtually at an end. A treaty of peace was ratified at a conference between the British and the Basutos held near King William's Town on the 9th of March, 1853. This war cost England about a million and a half sterling. The country called British Kaffraria is a large district eastward of Cape Colony, on the eastern side of the Orange river. It is a kind of sovereignty or protectorship, the precise character of which has not been very clearly defined. British military posts are maintained at various points over the area. The district is divided into counties. Buffalo River is considered the harbour. A town called Basuto was established at the mouth of Buffalo River.

KALE, or KAIL, SEA. [CHAMBA.]
KAI SARIEH, a town in Asia Minor, is situated in a plain to the north of the Euphrates (the ancient Argoans) in about 36° 41' N. lat., 35° 25' E. long., and has a population variously estimated at 28,000, 40,000, and 50,000, consisting of Turks, Greeks, and Armenians. The plain is laid out in corn-fields, and screened on the east and west by low hills covered with gardens and vineyards, and the whole neighbourhood abounds with volcanic deposits. The town is surrounded by an old walled moat, and further defended by an old citadel partly in ruins. The houses, which are from 8000 to 10,000 in number, are built of stone and lime, but many of them have a cracked and dilapidated appearance caused by the frequent earthquakes. The streets are narrow and dirty, the squares and market-places also abound with filth; and the naturally healthy climate is poisoned by the filth. Among the principal manufactures of this town are leather, wine, and tobacco. The chief exports are corn, beans, rice, and tobacco. The Armenians have a bishop and two churches in Kaisarieh; the Greeks also have a church. The manufactured products of the town are chiefly yellow marocco leather, cotton stuff, and cotton-yarn.

Kaisarieh in site and sound is identical with the ancient Cesarea, the capital of Cappadocia, which was originally called Mazaca. The plain in which it stands is watered by the Melas, now called the Karasu, which was dammed up by King Ariarathes to form a lake a little above its entrance into the Halys (not Enaphrates as erroneously stated by Strabo). Mazaca was called also Beroeia, and numerous coins with this epigraph have been found on the site. It was taken by Tigranes, and its inhabitants carried off to his new capital Tigranocerta. When Cappadocia was made a Roman province in the reign of the emperor Tiberius, Mazaca was named Cesarea. It became a place of great importance in the later times of the empire. When taken by Sapor in the reign of Valerian (a.d. 259) it had a population of 400,000. In the reign of Justinian the walls were repaired. There are many ruins and heaps of rubbish of ancient structures about the town. Cesarea gave title to a Christian bishop from an early period of the Church; it is the bishop's place of St. Basil the Great, who became bishop of Cesarea, a.d. 370.
KANE, ELISHA KENT, M.D., of the United States Navy, was born February 2, 1830, in the city of Philadelphia. He was a son of Judge Kane, of Philadelphia, and the elder brother of Dr. James S. Kane, of the University of Virginia, and studied medicine in the University of Pennsylvania, where he graduated with honours as M.D. in 1842. He was almost immediately afterwards appointed Secretary to Sir George Cockburn, the governor of New South Wales, and settled on the interior of the island of Ceylon, and availed himself of the facilities afforded by his position to explore the Philippines, which he accomplished chiefly on foot, and made charts and maps which are still preserved. He descended into the great crater of Tael, in the island of Luzon. The descent had only once before been attempted by a European, and was unsuccessful. Dr. Kane was lowered into the crater by means of a rope formed of bamboo, and reached ground at a depth of more than 200 feet. He then obtained for himself from the rope, and clambering downwards dipped his specimen-bottles into the smoking lake. In returning, the hot ashes charred his boots; and owing to their giving way under his feet, he fell repeatedly before he was able to get up. His position in the Melinead crater, which was at length hauled up nearly insensible. After remaining some time in China, he traversed a part of Hindostan. He afterwards proceeded to Egypt, where he examined the interesting antiquities of the Upper Nile, but unfortunately lost his life in a journey to the Red Sea, while in the Melinead crater, and was at length hauled up nearly insensible. After being wounded in the battle of Napolocca. Dr. Kane was engaged in the American coast-survey of the Gulf of Mexico, when he received a notice by telegraph, May 12, 1850, of the intended expedition in search of Sir John Franklin, by means of two vessels furnished by Mr. Grinnell of New York, and fitted out at the expense of the government of the United States. He immediately hastened to New York, and on the 22d of May the two vessels, the Jason and the Sarah, were launched, and fitted out by the city. Dr. Kane was attached to the expedition as senior medical officer, on board the Advance, under Commander De Haven. The expedition left Baffin's Bay, its return, September 6, 1851, and after a favourable passage of twenty-four days, they reached the mouth of the Expedition Channel. The U. S. Grinnell Expedition in search of Sir John Franklin, a Personal Narrative by Eliza Kent Kane, M.D., U. S. N., with Illustrations, 8vo, 1853, London and New York. Before he had completed the preparation of this work for the press, Mr. Grinnell of New York, in conjunction with Mr. Peabody of London, prepared a second searching expedition, in the Advance, which was placed under the command of Dr. Kane, and sailed from New York on the 31st of May, 1853. The Advance sailed from Baffin's Bay, and through Smith's Strait, and reached 70° 43' N. lat., the highest latitude attained by any of the expeditions, except that of Parry in his attempt to reach the North Pole. The Advance was frozen up during twenty-one months, provisions became scarce, and the supplies were at length exhausted, the men were affected with scurvy and other sickness, and two of them died, as did also the sledge-dogs. Dr. Kane, under these circumstances, resolved to quit the ship, and endeavour, partly in boats and partly in sledges, to reach the coast. He left Greenland, 3,130 miles south from the position of the Advance. During the greater part of this journey their daily provision consisted of six ounces of bread-dust and a piece of frozen tallow the size of a wax candle. A great many, it is supposed, perished, and when almost in a state of starvation, they killed a seal. At the end of eighty-four days they reached the Danish settlements of Upernavik, where they were kindly received and hospitably treated. Only one man was lost on this terrible journey, and he by accident. Meanwhile, nothing having been heard of Dr. Kane and his party, the government of the United States fitted out a relief-expedition, consisting of a small screw-steamer and a clipper-boat, under the command of Lieutenant Harlow of the United States navy. This expedition sailed from New York on the 31st of May, 1855, and, having reached the Danish settlements, the missing party were found, and arrived at New York on Oct. 11, 1855. In May, 1856, the gold medal of the Royal Geographical Society of London was awarded for their signal services and important discoveries in the polar regions, and for his valuable memoir and charts. In 1856 Dr. Kane published his 'Arctic Explorations: the Second Grinnell Expedition, 1850-51,' Philadelphia, 8 vols. 8vo. In the autumn of the same year he paid a visit to England, and being in a state of failing health proceeded thence to the island of Cuba, in hope that he might derive benefit from the climate, but died at Havana, February 16, 1857. His remains were consigned to his native city of Philadelphia, and were interred there with unusual demonstrations of public respect and grief.

A badly written 'Biography of E. K. Kane,' by W. Elder, was published in 1858.

KANSAS, a Territory of the United States of North America, established by Act of Congress 1854, occupies the country lying along the river Kansas, north of the Indian Territory, and extending northward to the Nebraska River. It is bounded on the north by the Great Lakes, on the west by the States of Iowa and Missouri; S. by the Indian Territory; W. by the Rocky Mountains, and N. by the Territory of Nebraska. The area is 114,706 square miles. The estimated population in 1856 was 34,000.

By far the greater portion of the territory consists of an unreclaimed wilderness, over which roam tribes of native Indians in search of game. The eastern and southern portions are broad open prairies, well watered and very fertile, but thinly inhabited. The western portion of the Territory forms a part of the Great American Desert, which is said to be for the most part wholly irreclaimable, and to present scarcely an oasis. On the west are outlying members of the Rocky Mountains. The chief river of the Territory is the Kansas, which rises on the northern side of the territory, and joins the Rocky Mountains, between the sources of the Arkansas and Nebraska. Its two principal branches, the Republican and Smoky Hill forks, run for a considerable portion of their course at a distance of 150 miles apart. Republican Fork issues from a rather large lake between 30° 32' N. lat., 103° 30' W. long.; Smoky Hill Fork rises in the mountain region east of South Peak: their junction is near 39° N. lat., 100° 30' W. long. The united stream is known as the Kansas: it is navigable for a great part of its course. Its general course is to the south-east, and joins the Missouri in 38° 50' N. lat., 94° 28' W. long. It has a full body of water, is 340 yards wide at its mouth, and is said to be navigable for steam-boats for 150 miles, and for keel-boats, with its forks, for some hundreds miles higher. Republican Fork, the larger of the two, is used extensively by the Missouri, and receives on its right side two considerable affluents, Solomon's Fork and the Grand Saline. Numerous smaller tributaries swell the main stream and its affluents. The chief of the secondary streams belonging to this Territory, which fall into the Missouri are the Nemawhaw and the Independence. The Missouri itself forms the eastern boundary of Kansas, and affords an invaluable outlet for its products. The Nebraska River, on the northern side of the Territory, is a very wide but shallow river, with a rapid current and a bed of shifting sand-banks; it is navigable by steam-boats for about 50 miles. The great emigrant and freemont routes to Oregon, Utah, and California lie across the Territory of Kansas, and follow the line of one or other of these rivers.

As far as the country has yet been examined geologically, its southern and eastern parts appear to belong to the Lower Carboniferous system; the rocks consisting largely of mountain limestones and sandstones. In the south-eastern corner is a very wide but shallow river, with a rapid current and a bed of shifting sand-banks; it is navigable by steam-boats for about 50 miles. The great emigrant and freemont routes to Oregon, Utah, and California lie across the Territory of Kansas, and follow the line of one or other of these rivers.

The river bottoms have a rich alluvial soil. The few settlers who have established themselves within the Territory are said to report very highly of its capabilities, but as yet even
The surface of the country is very little known. The only settlement beyond the recently-founded city of Worcester and a few scattered farm-houses, is the military station of Fort Laramie in Wyoming.

The vast tract known as Nebraska, including an area of upwards of 306,000 square miles, of which Kansas forms the southern part, was a portion of the country purchased by the United States from the French in 1803. It has been left till recent times under Indian dominion, the constant stream of western migration, which caused the growth of one and another Territory and State on its eastern and southern borders, and still more recently the blow struck by the Kansas and Nebraska Railroad across the territory between Utah and California, led to propositions which increased yearly in urgency for its organisation as a Territory. The first bill for the organisation of the Territory of Nebraska was introduced into Congress in 1846, but rejected. Subsequently a second bill was introduced in 1847, and a third session of 1854 a bill was introduced for forming out of this extensive tract two Territories, Nebraska in the north, and Kansas in the south; and as the form of the bill re-opened the question of the admission into the Union of the new slave states north of 36° 30' N. lat., which the measure known as the Missouri Compromise was understood to have settled should not be done, it was made the occasion of a most earnest struggle between the supporters and opponents of slavery. The bill was passed, and the new Territories of Nebraska and Kansas were formed by an act of Congress on May 30, 1854, which was introduced by the late H. C. P. Bingham, of Ohio.

In preparing this map a careful examination of the reports on the territory and documents in the hands of the Department of the Interior, and of the records of the United States, have been consulted. The boundaries are taken from the maps of the United States in the possession of the Bureau of Education, and the chief objects of interest have been marked. The railroads are those which are in existence or proposed for construction.

Utah Territory.

The KANURAN, or KARAN, has been sometimes given also to the Persian province of Kerman. [Persian.]

KARIA, or KARINA, a division of Asia Minor, which comprised the south-western corner of that peninsula. It was bounded S. and W. by the Mediterranean Sea, N. by the valley of the W. branch of the Taurus, E. by the Caspian Sea, and S. by the Persian Gulf, and is bounded by the Euphrates, which is omitted on the map. Kerman was the seat of a flourishing petty sovereignty in the 14th and 15th centuries. It is identified with the ancient Laranda.

The name Karamania has been sometimes given also to the Persian province of Kerman. [Persian.]
It is identified by the Ionian revolt (a.d. 499-494) the Carians fought bravely side by side with the Greeks, but were at last compelled to submit. Under the protection of Persia, Caria was ruled by a dynasty of princes, whose capital was Halicarnassus. Aristeas, who was called son of Xerxes by some, and brother by others, was the king of Halicarnassus. This city was the seat of a queen, called Ada. She surrendered to Alexander the strong city of Alinda, in consideration for which he restored her to the royal authority of which she had been deprived. Caria afterwards became successively subject to the Greek kings of Asia, and was eventually in the hands of the Romans. Thus Caria, which in the times of Herodotus was one of the seven petty sovereigns, became afterwards the birthplace of Herodotus and Dionysius the historians. It was founded by a colony from Troizenias Argolis, was the largest and strongest city in all Caria, and became the seat of a Carian dynasty under the protection of Persia. Caria contained two towns, Halicarnassus, erected in his honor, the celebrated sepulchral monument called the Mausoleum, of which there are still remains as well as of the ancient walls. Some interesting sculptures, supposed to have formed part of the decoration of the Mausoleum, are now in the British Museum. Halicarnassus was destroyed by Alexander the Great. The Carian was a warrior, not addicted to commerce like the Greeks; their prosperity was that they hired themselves as mercenaries, and served under the kings of Egypt.

Among the towns of Caria were Caria (the Ionian revolt) and Halicarnassus, which were the names of the Doric cities in Asia. Halicarnassus, the capital of Caria, and Delos, were the seats of the Carian king, and the birthplace of Herodotus. The Carian capital, the site of Caria, was called Caria, and stood near the Gulf of Caria. Herodotus, in his account of the Ionian revolt, says (p. 499-494) the Carions fought bravely side by side with the Greeks, but were at last compelled to submit. Under the protection of Persia, Caria was ruled by a dynasty of princes, whose capital was Halicarnassus. Aristeas, who was called son of Xerxes by some, and brother by others, was the king of Halicarnassus. This city was the seat of a queen, called Ada. She surrendered to Alexander the strong city of Alinda, in consideration for which he restored her to the royal authority of which she had been deprived. Caria afterwards became successively subject to the Greek kings of Asia, and was eventually in the hands of the Romans. Thus Caria, which in the times of Herodotus was one of the seven petty sovereigns, became afterwards the birthplace of Herodotus and Dionysius the historians. It was founded by a colony from Troizenias Argolis, was the largest and strongest city in all Caria, and became the seat of a Carian dynasty under the protection of Persia. Caria contains two towns, Halicarnassus, erected in his honor, the celebrated sepulchral monument called the Mausoleum, of which there are still remains as well as of the ancient walls. Some interesting sculptures, supposed to have formed part of the decoration of the Mausoleum, are now in the British Museum. Halicarnassus was destroyed by Alexander the Great. The Carian was a warrior, not addicted to commerce like the Greeks; their prosperity was that they hired themselves as mercenaries, and served under the kings of Egypt.

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tiful Ionic temple of Aphrodite, from whom the town was named. There was a city Planae, probably not far from Aphrodisias. Fellows ("Asia Minor") says that Obura is the exact place. In 1856 the town was entirely destroyed by Mount Cadmus, near the confines of Caria, Lydia, and Phrygia. It was famous for its hot springs on the banks of the Meander, by which its site has been identified. Hamilton ("Researches") conjectures that the town was named from its position on the boundary of Caria towards Phrygia (Καρπος).

North of the Meander were Tripolis, near the point where the river enter the plains (38°'1 N. lat.), where are ruins of ancient theatres and temples, and some on by Lysippe, Ma-taura, west of Tripolis and north-east of the modern Nazeli, and near the modern village of Manastian, has some ancient ruins, most of which are overgrown with underwood, and a fine spring of cold water: Trullus, situated on a picturesque hill, was at one time inhabited by the Galatae, a tribe generally located to Lydias, to which later times they seem to have belonged.

Along the west coast beyond Halicarnassus were Myndus, once the capital of Caria: Caryanda, a city which seems to have been partly on an island and partly on the mainland, two parts separated by a narrow sandy isthmus, alongside of which was the harbour which Leake takes to be that of Pala:ion: Melia: Borgi, on the southern shore of the isassic Gulf, between Myndas and Issaus, celebrated for its statue of Artemis Cypria, upon which, though exposed to the open sky, neither rain nor snow (it was said) ever fell. Issaus, or Issaus, now Askem, Asyn, Kalceos, on a small island at the head of the Iassic Gulf, was destroyed by Argive colonists, but received additional settlers in the time of Alexander; it became a wealthy place owing to its fisheries; part of the city walls and a theatre cut out in the side of a rock still remain. Brachida was famous for its oracle and temple of Apollo Didymus, on of which there are still some remains; the temple was robbed and burnt by the Persians (n. 494), but it was afterwards rebuilt. A sacred way led from the sea to the temple bordered with monolithic statues seated on chairs, the feet close together and the hands on the knees—and that of the last place of the line of the temple was called "a Asia Minor.") Brachidea stood near a harbour, called Panumus, on the south of the Possidion.

Miletus, one of the most ancient and flourishing towns of Caria and famous for its temples and statues and the numerous colonies founded by it on the Black Sea, was considerably destroyed by an earthquake, and on the south bank of the Meander and near its mouth. Its citizens were great traders and powerful by sea. They carried on long wars against the Lydian king. It was subjected to the Persians by Cyrus the Great, and notwithstanding its ancient and present condition continue prospers until the Roman revolt, instigated by their artistic colonize; this event brought them down to the vassalage of the Persians, who utterly destroyed it n. 494. It was rebuilt, and made a long resistance to the army of Alexander; but it never recovered its former importance, although it was a prosperous place under the Romans. Its site is marked by the modern village of Paliatis, where are seen the remains of an enormous theatre, an aqueduct, and a Christian church formed out of a Greek temple. South-east of Mileta, in the interior near the brackish lake of Baffi, which is probably part of the ancient Lacotamicus, was Heraclea in the western foot of Mount Latmus, where some ruins mark the spot. Near it was the cave of Endymion. To the north of this end of the lake, near the Meander, was Myrissa, and on the east side of Mount Latmus lay Amyrion, ruins of the city and walls of which remain. (P. Robert, Minor; Sir C. Fellows, Asia Minor; Hamilton, Researches in Asia Minor; Dictionary of Greek and Roman Geography.)

KARR, a town in Turkish Armenia, is situated in a high region, 6,600 and 7,000 feet above the level of the sea, on the Arpa, a feeder of the Araxes, about a straight-line distance N. E. from Erevan, N. W. from Bayand, and S. E. from Batoum on the Black Sea, in 40° 27' N. lat., 43° E. long., and has about 15,000 inhabitants. It is about 46 miles W. S. W. from the Russian town of Baku and 20 miles N. of the town of Tralles. There is good clay for making tiles and bricks, and large fields of sugarcane. The people are mostly Armenian, and the town is walled and has a citadel built by Amurat III.: but it is untenable against artillery, being commanded by heights within muse that range on the opposite side of a deep narrow ravine traversed by the Arpa. The two portions of the town are connected by a causeway, which is sometimes traversed by the river which encircles the walled portion of the town on three sides. Kar was formerly a large town with from 6000 to 8000 houses, but a great part of the Turkish population abandoned its during the Russian occupation (1853-56), and the inhabitants now consist of a few Russian army all the Armenians emigrated to the neighboring provinces of Russia; so that from Russian violence and the desertion of its inhabitants it fell into a state of ruin and decay.

Soon after the commencement of the late war between Turkey and Russia, General Quyon was sent to Kar at the end of 1853 as chief of the staff and president of the military council. He disciplined the Turkish army, and constructed defences. He was succeeded in 1854 by Lieutenant-Colonel Williams and in 1855 by Col. Sir John Keith, Turkish Majesty's Commissioner with the Turkish forces in the East. The defences were extended and improved, so that when the Russian General Mouravieff, who had invested Kar, attempted to take it by assault, Sept. 29, 1856, his father's day in the valley, however, after being reduced to the extremity of starvation, were obliged to capitulate. General Mouravieff treated the garrison, soldiers and inhabitants, as well as officers, with great humanity and kindness. By the treaty of peace concluded at Kar at Paris in 1856, Kar was evacuated by the Russian army, and restored to Turkey.

The picturesque of Kar includes the most northern part of Turkey in Asia, and the town is called the "capital of Caria" and in the "capital of Syria" in the "capital of Armenia." The town is said to have been founded by the Persians near the south of the Khor or Araxes, and from the Achaemenids to the modern town of Kar, which is the most ancient part of the Turkish dominion.

KAWRIE PINE. (Aparthis.)

KEITH, Benf休re, Scotland, a market-town in the parish of Keith, is situated in 56° 39' N. lat., 2° 40' W. long., on the banks of the small stream called the Iala, about 20 miles S. W. from Banff, 176 miles N. by E. from Edinburgh. The population of the town of Keith in 1851 was 2101.

The town comprises three distinct villages, called Old Keith, New Keith, and Keithburn. (L. Keithburn.) The castle of Keithburn is a large house, built by a nobleman of the Keith family, a very ancient village, and at one time was a royalty. It is now a mere hamlet. New Keith dates from the middle of last century. It consists of five principal streets, intersected by several smaller ones, with a square or market-place in the centre. It has many small houses and churches, a church house, an Episcopal and a Roman Catholic chapel, besides chapels for congregations of the Free Church and United Presbyterian bodies. There is a library and a savings bank. A grain-market is held weekly; and a cattle-fair, held annually, is the most important of which is "Summer Eve Fair." Fife Keith, a modern village, on the bank of the Iala, opposite Old Keith, with which it is connected by two bridges, consists of several well-built streets. Many of the inhabitants of Keith are employed in the manufacture of wools, flax-dressing, weaving, bleaching, and the manufacture of tobacco.

KELIADJE, a family of minute Molluscs belonging to the Littorinae, Asaphae, or Asaphid, and is the only species in this family between the Family Keliadje and Cyclostomata. The English Keliaede is known to the genera Montacuta, Turionia, Kelia, Lepont, and Galeone. The genus Kelia has two British representatives, K. subbifurcata and K. wiidio. They are small but elegant animals, living in the crevices of rocks, on shells or sea-weeds, spinning a byssus, or lying free. There are about a dozen species known in different parts of the world. This genus, from which the family takes its name, was named after Mr. O'Reilly of Dublin.

KELIS, WIMWIE.

KEMBLE, CHARLES, was born on the 25th of Nov. 1776, at Brecon (Brecknock) in South Wales. His father was Roger Kemble, an actor and theatrical manager. He was educated at the English Roman Catholic College at Douay, in the French department of Nord, whence he re-
turned to England in 1792. He was placed, through the influence of his brother, J. P. Kemble, in the General Post-Office, London, but soon resigned his situation, and after a few trials in private theatres, made his first appearance on the public stage at Sheffield, as Orlando in 'As You Like It.' He had engagements afterwards at Newcastle and other towns. On the 21st of April, 1794, he made his first appearance in London, as Malvolio, in the opening of the new theatre at Drury Lane. He afterward married Miss Macbeth, Mrs. Siddons Lady Macbeth, and Mr. Palmer Macduff. He continued for a considerable time to play secondary characters, but gradually improved in his art. On the:nth of November, 1796, he performed George Jones in 'Adoration of the Golden Calf', at Drury Lane, Mrs. Siddons playing the part of Millwood. In 1797 he was engaged at the Haymarket theatre, where in 1800 he brought out his adaptation of Mercier's 'Deserters,' under the title of 'The Point of Honour,' which was performed successfully, and became a stock-play. On the 2nd of July, 1806, he married Miss Marie Therese De Camp, of French parentage, but born at Vienna in 1774. Miss De Camp was engaged by her father as a danseuse at the Opera-House, London, at a very early age. Her father died when she was in her twelfth year; she was then trained and instructed by some ladies, and had become, when Charles Kemble married her, a favourite actress in the walk of high comedy, and she so continued as Mrs. Charles Kemble until 1821, when she quitted the stage in September, 1838. In 1807 Mr. Charles Kemble brought out with success at Covent Garden 'The Wanderer,' or the Rights of Hospitality; which is an adaptation of Kotzebue's 'Edvard in Schottland,' and in 1808, at the Haymarket, 'The Good Samaritan,' or 'The Country Counterplot,' an adaptation of a French piece called 'Le Portrait de Michel Cervantes.' Three or four other dramatic pieces from the German and French, which he brought out afterwards, were less successful. Meanwhile he continued to improve in his profession, and in 1810, when he was considered in his character was without a rival. Among his best characters may be mentioned Orlando, Falconbridge, Cassio, Leon, Benedick, Young Mirabel, Mercutio, Petruchio, Archer, Raffles, and Capt. Singleton. No British artist had such characters as his handsome features, fine voice, and tall well-formed athletic person, peculiarly fitted him. He closed his career as an actor on the 10th of April, 1840, shortly after having been appointed to the office of Examiner of Plays. He appeared in public occasionally afterwards as a reader of Shakespeare. During some of his latter years he suffered the inconvenience of deafness. He was well acquainted with modern languages, and a tolerable classical scholar. He died at his residence, No. 10, Newman Street, November, 1846, aged seventy years within a fortnight.

Mr. Charles Kemble left one son and two daughters. His son, John Mitchell Kemble, is noticed in a separate article. His eldest daughter, Frances Anne Kemble, known as Fanny Kemble, became a celebrated actress. She was separated from the other daughter, Adelaide Kemble, distinguished herself as an operatic singer. She became the wife of Mr. Sartoris, and then quitted the stage.

KEMBLE FAMILY. The Kemble family form probably the most extraordinary group of actors and actresses ever known. Macklin, when nearly 100 years of age, addressing John Philip Kemble, said, 'Sir, I have known your family from generation to generation. I have seen you and your father; I have seen your grandfather, and I have seen your grandfather, sir. Sir, he was a great actor.' The grandson of a grandson is the old song. Former Kemble (George Stephen Kemble), the third of the children, was born on the 3rd of May 1792, at Kingston, in Herefordshire. He was intended for the medical profession, and was placed with a surgeon at Coventry, but gave the preference to the stage. After a course of practice in the country he made his first appearance in London, at Covent Garden, on the 24th of September, 1753. In the same year he married Miss Satchell, a favourite actress. After acting for some time at Covent Garden he was engaged at the Haymarket. He became afterwards a member of a company that performed at Edinburgh and Glasgow, and subsequently of another that acted at Newcastle, Durham, Sunderland, Lancaster, and Whitehaven. He was a good actor, but became so hulky in person as to be almost unfit for any character. He became then nearly bankrupt, and migrated to London and the country. His last performance was in the character of Sir Christopher Carver, in the farce of 'Inkle and Yarico,' a few days after which he was attacked by inflammation of the bowels, and died on the 6th of June 1822, at the Grocers' Hall, London.

FRANCIS KEMBLE, the fourth child of Roger Kemble, was born on the 28th of December 1769, in the city of Hereford. She also became an actress, and performed in Lond-n; but having become the wife of Mr. Francis Twiss, quitted the stage. She died in 1812, at Bath.

ELIZABETH KEMBLE, the fifth child of Roger Kemble, was born on the 2nd of April 1781, at Warrington, in Lancashire. She was apprenticed to a mantua-maker, but left that occupation for the stage. After some practice in the country, she made her first appearance in London at Drury Lane Theatre, on the 22nd of February 1783, as Portia in 'The Merchant of Venice.' After repeating Portia she repaired to York, where she had previously succeeded in engagements in various parts of the kingdom, and her voice and address in the sweetest of English voices, and her striking resemblance to Mrs. Siddons. On the 21st of June 1786 she was married to Charles Edward Whitlock, an actor and joint-manager of a theatrical company in the north of England, known as the 'Old Joint Stock Company.' His wife was invested by Mr. Kemble with the management of the company, and Whitlock became the principal actress. The circuit of this company embraced Newcastle, Durham, Lancaster, and Whitehaven. Cooke and Munden were members of it before they appeared in London. In 1789 Mrs. Whitlock accompanied her husband to America, where she became almost as great a favourite as Mrs. Siddons was in England. She performed mostly at Philadelphia and Charleston, and frequently before General Washington. Having acquired an independence, Mr. and Mrs. Kemble were visited and entertained by Mr. Washington, and Mrs. Whitlock died about 1820, at 1830. Mrs. Whitlock was much admired in society for the liveliness of her conversation. She died on the 27th of February 1836.

The other children of Roger Kemble died young, except a daughter, Anne, born in 1764, who was alive in 1834.

KEMBLE, JOHN MITCHELL, well known as one of the chief Anglo-Saxon scholars of his age, and also distinguished as an actor, was born on the 17th of December 1745, at Chester. His great-grandfather, Charles Kemble, and was born in 1807. He was educated at Trinity College, Cambridge, where he took the degree of B.A. in 1830, and that of M.A. a year or two later. From the very first his studies were directed towards the Anglo-Saxon language and literature; and in 1857 he published his accomplishments in this department by the publication of 'The Anglo-Saxon Poems of Beowulf, the Traveller's Song, and the battle of Finnesburgh, edited, together with a Glossary and an Historical Preface.' The work reached a second edition in 1857, when an additional volume, containing 'A Translation of the Anglo-Saxon Poem of Beowulf, with a Glossary and Notes,' was appended to the first. The more important of Kemble's subsequent works, were the 'Codic Dictionaries and Catalogues of the British Museum,' published in 1839, vol. ii. 1840; 'The Anglo-Saxon Charters,' the 'Vercelli Codex; Poetry of the Codex Vercellensis, Anglo-Saxon and Latin, with an English translation,' published in 1849 as one of the works of the 'Elfin Society; the 'Dialogues of Solomon and Saturnus, with an Historical Introduction and English Translation,' published in 1848 by the same Society; an edition of Twyman's 'Considerations upon the Government of England,' published in 1849 by the 'Genseric Society,' 'A History of the English Commonwealth till the period of the Norman Conquest,' published in 2 vols. in 1848. This last work comprehends the main results of Mr. Kemble's Anglo-Saxon and historical studies. For a good many years Mr. and Mrs. Kemble were joint-author of the 'British Review,' a periodical of the highest class, which exercised considerable political and literary influence, but ceased to exist about the year 1845. He held the office of Examiner of Plays under the Lord Chamberlain, his acting assistant in this office being Mr. Donne. Mr. Kemble was a Fellow of
where it appears he did not distinguish himself. From thence he was entered at Caen College, Cambridge. Here again he failed to distinguish himself, for Cambridge had at that time no honours for those whose tastes led them to cultivate the natural sciences. He took his degree of B.A. in 1781; and having entered upon holy orders, was appointed shortly after to the cure of Barham, in his native county. In 1784 he married Miss Ripley of Debenham. At this time he examined Dr. Ray's new insects, whose writings on controversial divinity were highly estimated. Mr. Kirby had however no taste for polemics, and although he never neglected the duties of his office for the pulpit, his taste for the latter became so decided, that he published a few little objects directly connected with his profession as a clergyman.

Left to the natural bent of his genius, and surrounded with objects of natural history, his early love of plants was rekindled, and he cultivated a knowledge of the plants of his neighbourhood. An accident drew his attention to insects. "About half a century since," he says, in a letter to a friend in 1836, "observing accidentally one morning a very beautiful golden bug creeping on the sill of my window, I took it up to examine it, and finding that its wings were of a more yellow hue than was common to my observation of those insects before, I was anxious carefully to examine any other of its peculiarities, and finding that it had two as yet not noticed wings, and that the captured animal was imprisoned in a bottle of gin, for the purpose, as I supposed, of killing him. On the following morning, anxious to pursue my observation, I took it again from the gin and laid it on the window-sill to dry, thinking it possible that the animal to which it happened commenced my farther pursuit of this branch of natural history. These facts were communictted to Dr. Gwyn of Ipswich, who was a good naturalist, and led him to recommend to his young friend the pursuit of entomology. So diligent was Mr. Kirby in the pursuit of this new science, that he was able to find him warmly taking up the cause of natural history, and becoming one of the first members of the Linnean Society, founded by Sir James Edward Smith in 1787, of which he became President. In 1790 the Linnean Society. It was entitled 'A description of three new species of Hiruso,' and was published in the second volume of the 'Transactions.' His next paper, which was published in the third volume of the same Transactions, was 'A History of three species of Caxida.' In the same volume is a letter to Mr. Marham, containing observations on the Insects that infested the Corn in the year 1786. He became early alive to the importance of making the pursuit of entomology practical, and paid particular attention to those insects which attacked wheat, and other grain crops. The last paper was followed by others on the 'Tipula Tritica,' on 'Insects that prey upon Timber;' and in the fifth volume of the 'Linnean Transactions' is a paper entitled 'Observations on some insects of the genus Myrmele.' These and other papers indicate great accuracy of observation, and prepared him for a work of higher and more important scientific interest. The family of Hymenoperna, including the bees and wasps, had been but imperfectly studied in this country, and he devoted himself to the production of a separate and complete work on English Bees. This work was published at Ipswich, in two volumes, with plates, in 1809, and was entitled 'Monographia Apum Angliae, or an Attempt to produce a complete genera and families of the Linnean genus Aplis as have been discovered in England, with descriptions and observations.' This work embraced also general remarks on the class Hymenopera, and a table of the nomenclature of the external parts of these insects. The publication of this work at once gave him a high position amongst the naturalists of Europe, and brought him into correspondence with Fabricius, Leitirelle, and other naturalists on the continent of Europe, as well as all the more eminent naturalists of his own country. This work was followed up by a monograph of the recent literature of entomology, but was perhaps surpassed in scientific interest by his discovery of the genus Stylus, which he indicated as the type of a new order of insects, to be called Deuteropera, of which he found parasitical during their larva state in the bodies of bees, and the novelty of their history and beautiful forms excited a lively interest in the entomological world.

But whilst these discoveries were going on, he was preparing for a work by which his name became more widely known and imperishably associated with the popular literature of his country. We allude to the 'Introduction to Entomology,' which he published conjointly with Mr. Spence.

Mr. Kirby's acquaintance with the latter gentleman commenced in 1805, and resulted in Mr. Spence proposing a letter dated November 23, 1806, that they should write in partnership a popular introduction to Entomology. This proposition was readily acceded to by Mr. Kirby, and in November 1807 of this year the first edition went through three editions, and in 1817 the second volume was published. On account of the illness of Mr. Spence the third and fourth volumes did not appear till 1826. This work at once took a position amongst the classical productions of one who has added so much to the literature of insects. It is a model of the manner in which works on natural history to be popular should be written, and is almost exhaustive of the subject of the habits, uses, injuries, and instincts of insects. Of the fifty-one letters of which this work consists, it appears that twenty were written by Mr. Kirby, nine by Mr. Spence, and twenty-two by the two authors conjointly.

In 1830 Mr. Kirby was applied to by the trustees appointed under the will of the late Earl of Bridgewater to write one of the works since so well known as the 'Bridge-water Treatises.' Although he was then in the seventieth year of his age, the production of such a work was considered as a fitting task for a gentleman of his rank and attainments, and he at once commenced his farther pursuit of this branch of natural history. These facts were communicated to Dr. Gwyn of Ipswich, who was a good naturalist, and led him to recommend to his young friend the pursuit of entomology. So diligent was Mr. Kirby in the pursuit of this new science, that he was able to find him warmly taking up the cause of natural history, and becoming one of the first members of the Linnean Society, founded by Sir James Edward Smith in 1787, of which he became President. In 1790 the Linnean Society. It was entitled 'A description of three new species of Hirudo,' and was published in the second volume of the 'Transactions.' His next paper, which was published in the third volume of the same Transactions, was 'A History of three species of Caxida.' In the same volume is a letter to Mr. Marham, containing observations on the Insects that infested the Corn in the year 1786. He became early alive to the importance of making the pursuit of entomology practical, and paid particular attention to those insects which attacked wheat, and other grain crops. The last paper was followed by others on the 'Tipula Tritica,' on 'Insects that prey upon Timber;' and in the fifth volume of the 'Linnean Transactions' is a paper entitled 'Observations on some insects of the genus Myrmele.' These and other papers indicate great accuracy of observation, and prepared him for a work of higher and more important scientific interest. The family of Hymenopera, including the bees and wasps, had been but imperfectly studied in this country, and he devoted himself to the production of a separate and complete work on English Bees. This work was published at Ipswich, in two volumes, with plates, in 1809, and was entitled 'Monographia Apum Angliae, or an Attempt to produce a complete genera and families of the Linnean genus Aplis as have been discovered in England, with descriptions and observations.' This work embraced also general remarks on the class Hymenopera, and a table of the nomenclature of the external parts of these insects. The publication of this work at once gave him a high position amongst the naturalists of Europe, and brought him into correspondence with Fabricius, Leitirelle, and other naturalists on the continent of Europe, as well as all the more eminent naturalists of his own country. This work was followed up by a monograph of the recent literature of entomology, but was perhaps surpassed in scientific interest by his discovery of the genus Stylus, which he indicated as the type of a new order of insects, to be called Deuteropera, of which he found parasitical during their larva state in the bodies of bees, and the novelty of their history and beautiful forms excited a lively interest in the entomological world.

But whilst these discoveries were going on, he was preparing for a work by which his name became more widely
KIRKMUIR. [FORFAIRNERS.]

KIRTON. [LINCOLNSHIRE.]

KISCOENEF, or KICHEV, a town in European Russia, capital of the government of Bessarabia, is situated on the Byk, or Byon, a feeder of the Dniester, 40 miles N.W. from Bender and Tiraspol, on the latter river, 70 miles E. from Zinjan. It is called the, or settled by the Tartars, the Caucauss, Armenians, and Persia, and Baghdad. At this latter town he was detained during the plague. Mr. Grove there lost his wife, and Kito thence returned to England in June 1833.

In 1833, Mr. Woolcombe of Plymouth wrote a letter of introduction for him to Mr. Coates, the secretary of the Society for the Diffusion of Useful Knowledge recommending him for employment on the 'Penny Magazine.'

The year 1823 began with the publication of the 'Pictorial History 1861-63.' KIRTON.

The town is adorned with handsome marble fountains, and has a fine public garden. The inhabitants consist of Russians, Greeks, and Greeks, and gipsies, carry on a considerable trade in corn, cattle, sheep, hemp, tobacco, fruit, wine, &c. The principal industrial products are brandy, leather, soda, candles, some woollen stuffs, &c.

KITTA. [Convo.]

KIT6'S, St. [CHRISTOPHER'S, St.]

KITTO, JOHN, was born at Plymouth, December 4, 1804. His father had been a respectable builder, but soon after his son was born he was reduced into circumstances through the adoption of intermate habits. At four years old John Kito was transferred to the care of his maternal grandmother, by whom he incepted was called into activity by the relation of marvellous stories, and by leading him to notice and admire every remarkable object around him in the fields and woods. He early learned to read, and read with avidity all the books he could procure. By the time he was twelve years old, his father had descended to the rank of a jobbing mason. He was unable to keep his son at school regularly, who, whenever he could be made avail of, was required to attend his father in his labours. On February 13, 1817, having ascended a ladder with a load of slates, he fell from a height of thirty-five feet. He was taken up senseless, convulsed, and in a frightful state of insensibility. He recovered, but was himself unaware at first that he was deaf. He wondered at the silence around him, and, at length, asking for a book, was answered at first by signs, and next by writing on a slate. He inquired with astonishment, "Why do you not speak?" His attendant wrote again, "You are deaf." No efforts could restore his hearing. He still continued his reading, but in 1818 his grandmother obliged to quit Plymouth, and he was left to seek for a livelihood with his father, who was engaged in the wine business, and lived with his parents in a state of great destitution. At length, on November 15, 1819, he was placed in the house of a relation, where he was treated with much indulgence, and began to learn shoemaking. His deafness occasioned him to work at this art with great promptness and facility. In August 1820 he commenced a journal, which he continued till January 1822, and he was encouraged to write lectures which were read to the other boys. In 1821 his grandmother died, which event made a great and serious impression on his mind. In November 1821 he was apprenticed to a shoemaker; but his master was harsh, he was somewhat awkward, and still passionately devoted to reading. Finding himself uncomfortable, he wrote to some of his friends, and after pleading his cause in writing before the magistrates, he was taken back to the workhouse in May 1822.

Early in 1823 he wrote some essays which were published in Nettleton's 'Plymouth Journal,' and he also wrote some imaginary correspondence. In April 1824, Mr. Grove, a dentist, who had known something of him in Plymouth, but who was then settled at Exeter, engaged him in order to teach him his art, and he accordingly removed to Exeter, where he succceeded in attaching Mr. Grove to him as a student. In 1825 he published his first volume entitled 'Essays and Letters, by John Kito.' It produced but little profit, but it contributed to make him known, and excited the interest of many of the inhabitants of Exeter. By their efforts, greatly assisted by Mr. Grove, he was admitted to a fellowship of the College of Surgeons at London, and there to be taught printing, which it was thought might render him useful in some of the missionary establishments abroad. In 1829 he entered into business in July 1825, and was dispossessed of his printing office in June 1827, but his health being unequal to his work, he returned to England in February 1829. In the following May he agreed to accom-
whom he had a large family. She was a most effective assistant to him in his literary labours, and a seductress prompted his affection by the publication of her late husband, prepared by the Rev. J. E. Byland, founded on materials left by himself either in the form of journals or of letters.

KLAENBURT. [Clagenfurt.]

KNOTT-GRASS. [Polygono, S. 1.]

KOBELLITE. [Mineralogy, S. 1.]

KOLLAR, JAN, a poet and preacher, the originator of the idea of Panaslovism, was born on the 29th of July 1793, according to his son's account, at Mostovce, in the county of Trenschin in Hungary, being born a Slovak, or one of the Slavonic races of northern Hungary, who speak a language akin to that of their fellow-countrymen living at Belgrade in Serbia, and Jena, he became in 1819 pastor of a Slovakian evangelical congregation at Pesth. In 1823 and 1827 he issued a two volumes, under the title of 'Narodniz Zpievawsky, or National Songs,' an interesting collection of the popular poetry of the Slovaks, which reached a second edition, with additions, in 1834 and 1835. Unlike some other Slovakian authors however, he was far from exhibiting a narrow and exclusive attachment to his native dialect. Considering the Slovaks as too circumscribed in its range to be equal to the dignity of literature, he devoted himself to the writings the Bohemian, though it was at the time rejected for German in Bohemia itself by several of the native authors. In 1821 he published at Prague a volume of 'Slezky' (Poems), and in 1824 at Buda, a new edition, under the title of 'Slavny Dercy' (The Daughter of Glory). The copy of the second edition, in the British Museum, formerly belonged to Bowring, to whom it was presented by Sadařik, and who has written in it, 'This is a most remarkable book, and how its true and fiery spirit should have burst this Austrian censorship is altogether unintelligible to J. B." The leading ideas of the poems is that of the common bond of union between the Slavonic nations, and the work has an influence on consequences not less lingering than in any previous one. The same idea pervades the 'Cestopis' (Pesth, 1843), a record of a journey to Upper Italy, the Tyrol, and Bavaria, made by Koller in 1841, chiefly for the purpose of discovering traces of Slavonic antiquity.

Among his other productions is a volume of sermons, 'Kame' (Pesth, 1851), which were found so eloquent that they were translated into several languages. Kollar was obliged to leave Pesth by the revolution of 1848, and must in the same year have seen many of his hopes destroyed by the breaking up of the Slavic Congress at Prague by the action of Windischgrätz. In the next year he was, probably by way of compensation, named professor of archaeology at the University of Vienna. In 1851 he made a journey to Moskow to study the relations of the Ounavus, and on his return to Vienna was surprised by death on the 26th of January 1852, when he was preparing for the press a German work, 'Das slawische Altaitalien,' intended to prove that the ancient inhabitants of Italy spoke a Slavonic

The work of Kollar which is chiefly admired by his admirers, is his 'Slavny Dercy,' which in its latest shape, as it appears in his "Dils Bäaicki" (Poetical Works) published by his son in 1844, is a volume of 56 cantos, and extends to 692 sonnets, having little exception except the common idea of 'Panaslovism' which pervades them. Whatever the merit of some of the earlier portions, there can be no doubt that some of the later additions are scarcely inferior to the former, and were related to awoken respect for the works; in particular some coarse attacks on Mr. Paget and Miss Pararo, apparently dictated by a feeling of resentment at their having spoken well of the Hungarians. The prose works of Kollar contain very little information, which is however disfigured by an occasional aberrant observation; but the spirit of mere Slavonic nationality. Several of Kollar's sonnets are translated in Sir John Bowring's work on the Bohemian poets.

KOLLYRITZE. [Mineralogy, S. 1.]

KOLN, or CULN.

KONIYEH (Koniah, Koniah), a city in Asia Minor, capital of the pashalik of Karaman, which includes the greater part of Phrygia and Paphylia, is situated in a wide plain in 37° 54' N. lat., 32° 40' E. long., 305 miles E. by S. from Smyrna, and 155 miles N. from Kaflin, near the Arabian Sea. Population, 30,000. The town is surrounded by walls built with well-cut blocks of stone, and strengthened by square towers, some of them richly ornamented with cornices, arabesques, lions' heads, and Arabic inscriptions. To rise from the brink of a wide fossè, it is approached by hand-some gateways, some of which are constructed with fragments of ancient structures. Within, the city, when seen by Hamilton, presented little except ruin and decay; large spaces lay covered with heaped dilapidated mosques and deserted houses. The modern town and the bazaars occupy the more eastern part of the site, where also is the konak, or palace of the pasha. The houses are low, and mostly built of sun-dried bricks and wood. The old castle, which stands in the centre of the town, is a ruin, its upper stories having been removed to build the pasha's konak. Koniyyeh contains many beautiful remains of Saracenic architecture, among which may be mentioned the mosque of Sultan Bekir, the house of the late Memi Minareh Djamî (Mosque with the Minaret reaching to the Stars), which is exquisitely adorned with delicate tracery, fretwork, and monilings. The minarets are chiefly of glazed tiles and bricks of various colours, red and blue prevailing. The old Japanese prison, the largest building in the town, is an interesting half-ruined structure, bearing some resemblance to a gothic castle with its ruined towers, battlements, and keep. The pasha's konak is a large straggling building approached by a rather circuitous way between extensive burnt grounds, part of the old castle having been removed for a century. The other objects of note in the town are its large bazaars, several medresseh, or colleges, several sepulchral chapels, a few Armenian churches, the public baths and khans, and the tomb of a Moslem saint venerated all over Turkey. The manufactures are confined to carpets and blue and yellow marocco leather. Cotton, wool, and skins are sent to Smyrna. The immediate neighbourhood of the town is belted by a small breadth of garden-ground, which is kept in a state of verdure by irrigation. Other districts are a wide thirsty desert; in winter flooded and impassable. The city is supplied with fruit and vegetables chiefly from the Greek village of Ziliez, which is two hours' distant, and situated among picturesque gorges among the mountains. This village is inhabited by about 5000 Greeks, descendants of the ancient inhabitants of Konyeh, who were driven out and obliged to settle here by the Turks when they captured the city.

Koniye is the ancient Iconium, which Xenophon says (Anab., i. 2) was in Phrygia; in later times it was considered the capital of Lycaonia. Under the Romans it seems to have risen in importance. Gicero spent ten days in Iconium on his way to Sardica (Epist. ad Atticum, v. 20). In the first age of Christianity it is described as a populous city inhabited by Greeks and Jews. St. Paul and St. Barnabas preached in the synagogue of Iconium. Under the Greek emperors the city continued to be the metropolis of Lycaonia; but it was destroyed by the Goths, and afterwards by the Seljuk Turks about a.D. 1075, who made it the capital of their dominions. Under the Seljuk Turks, and during the period of the Crusades, Iconium acquired its greatest celebrity. The Seljuk dynasty and power terminated in 1224. After the period of anarchy the city was seized by Othman, the founder of the Ottoman empire in Asia, which had Brusa for its capital. From this time Konye declined rapidly. Ibrahim Pasha, commander of the Turks in Egypt, in 1832 completely defeated the Turks near Konyeh, December 20, 1832.

A Christian synod held at Iconium about a. D. 320 pronounced against the validity of heretical baptism. Koniye is looked upon by the Muslems as a sacred city; many devotions are re-
Greek and Roman Geography; London Geographical Journal, vols. viii. and x.; Conversations-Lexicon; L'Art de Vérifier les Dates.

KOSTENDJIE, or KOSTENDJIE, a sea-port town or rather village, 1848, and within the Canton of Geneva, is situated in the Bruderingen, the eastern termination of the fortification called Trajan's Wall, 226 miles in a straight line nearly due north from Constantinepollo, and about 40 miles E. from Resson. The town, which consists of about 550 houses, is built on the west shore of a basin being one of the few remaining episodes of horizontal rock, which rises precipitously from the sea to the height of about 100 feet, and shelters the harbour on the northern side. The harbour is exposed, except on the north side, and ill adapted for navigation; the water only 7 feet deep is not navigable. It occupies the site of an ancient town, Constantinia, which is said to have been founded and named from Constantine the Great. It retains in its ruined mule traces of Roman masonry. The town has some trade in corn. The project of opening a channel for the Danube across the Dobrudjeha is by the chain of lakes called the Kara-Sn into the harbour of Kostendjie has been often mooted. [Dukardinia, S. 2.]

KÖTHEN. [Köthen.]

KÖZEPP. [Esztergorn.]

KRAIN, or CARNIOLA, a crownland of the Austrian empire, is bounded N. by Carnicia, E. by Styria and Croatia, S. by Croatia and the Kistland, and W. by Friuli and the circle of Gorra. The area is 5538 square miles, and the population about 462,000. The surface is extremely rugged and mountainous. The principal chain of the Carnic Alps penetrates into the north-west of the crownland, where it terminates in the mass of Mount Terglou, the highest point of which rises to 10,909 feet above the sea level. The land which borders the north of the crownland is covered by an offset or continuation of the Carnic Alps, which springs from the main chain near the village of Weissenla in the north-western angle of the crownland, forming the watershed between the Drava and the Save, and running in a general south-east direction between Carnibia and Carniolla, through Croatia and Slavonia, where it terminates in the valley of the Danube. This range, which is distinguished by different names, covers with its ramifications the greatest part of the crownland, and forms the main boundaries of the Save, its highest points being the Leoblerberg (4747 feet), the Sattelberg farther east, and the Steiner Alps to the north of the village of Stein, which rise 10,000 feet above the level of the sea. These mountains are distinguished by their singular forms, and consist of steep, rough, and for the most part naked masses of limestone, with scanty vegetation and little timber. They are crossed by three roads, one from Villach to Laybach by the Wurzen Pass and the Upper Sautal, another by the Klagenspass, joined by the Leobler or Loibler Pass (4032 feet); and a third from Marburg and Celj to Laybach by the Trojana Pass, which is also traversed by the Vienna-Trieste railway, now open as far as Ljubljana, which rises in the northern part on the Carnic Alps and the chain that forms their continuation south-eastward, the Save has its rise in the glaciers that cover the northern flanks of Mount Terglou.

The central and southern parts of the crownland are covered by the Julian or Krainer Alps, and their ramifications. The Julian Alps run south-east from Mount Terglou between the Upper Save and the Iszno to Mount Kleek in Croatia, reaching the height of 7458 feet above the sea in the Sutkain, and close to the Carstian frontier. A branch runs southward from the main range on the northern and eastern edge of the peninsula of Istria; and along the western side of this ridge to the south of the Wippach extend a stony wilderness called the Karst, which is a plateau of limestone rocks abounding with strange clefts and fissures and funnel-shaped cavities, infested by furious winds, and almost entirely destitute of vegetation. In all this region there is not a single tree; in a few sheltered spots a little grass has grown; and the vine is seen to creep along the crevices of the rock. The Naas-Mountains (4000 feet) near Wippach with the main chain of the Julian Alps, here called Brinbaumber,er. From the Schnelberg a branch of the Julian Alps runs between the slopes of the Gark, rising in the summit of Jauerinj an elevation of above 6000 feet, and stretching up to the Save in the most eastern part of the crownland. The Julian Alps consist of granitic limestone which is shattered into rugged fragments, rent by chasms, and full of grottoes, caves, and underground passageways, abounding with the most beautiful stalactites. The rain that falls and the snow that melts upon them, form streams, which for the most part flow in subterranean channels, and the want of moisture at the surface gives these mountains an aspect of the most monotonous sterility. The rain falls freely to 10000 feet and the caverns in the Julian Alps, the most celebrated of which are those in the neighborhood of Alzannino. [S. 1.]

Immemorable rivulets disappear in the calcareous soil, and appear in the north on the mountain streams only after more than once into the chasms, which intersect the surface of the region, and pursue for a time an underground course. Nevertheless, some of the valleys present picturesque scenery, especially those of the Save and its feeders, and the Wippach. The lake of the Save, called the Idria, is formed by the course of the Idria, which has its source near the town of Laybach by the Adelberg Pass (3159 feet) across the Karst to Trieste. This last is intersected by a road from Görz through St. Veit, and Senoset to Fiume. Except in the river-valleys which form a comparatively small portion of the surface, the soil is very unfruitful, naked mountains, rocky levels, marshes, or sandy flats, being the prevailing characters of the country. The climate on the mountains and uplands is sharp; the winters severe and long; snow disappears from the mountains tops only in the height of summer. The Bora, or north-east winds, at times sweep the Karst and the more exposed parts of the country with furious violence. In the gorges and valleys the soil is much better; oaks, beech, and chestnuts abound, and vineyards are limited to use of the melting-furnaces. On the mountains many rare Alpine plants, medicinal herbs and roots are found. Horned cattle and horses are small; swine and poultry abound. Among the wild animals are deer, wild boars, the chamois, fox, weasels, martens, and marten. Rare. Birds of prey are numerous. Of game-fowl the principal kinds are pheasants, bustards, partridges, snipes, and water-fowl. Among the minerals the most important are iron, quicksilver, copper, lead, clay, alum, coal, marl, and iron. The forests are well wooded, sandy and whet stone. The mines of Idria in the west of the crownland, have been long famous; the entrance to them is in the middle of the town of Idria; they formerly yielded 16,000 cwts. yearly. The industrial products consist principally of woollen, woollen-cloth, woollen, iron and steel articles, such as scythes, sickles, naths, files, &c.; copper articles, woolen-cloth, leather, linen, face, pottery, paper, straw-hats, canvass, horse-hair sashes, tiles, German tinder, &c. A good number of the population are employed in mining and metallurgy. There is a considerable trade in timber and firewood.

The principal rivers are the Save and the Iszno. The Save, or Sava, rises on the northern bank of Mount Terglou, and runs first eastward along that mountain chain, then south-west to the town of Sautal, and there at a distance of 12 miles enters the Sava-s; its course is then south-west to the north-east to the south-westward of Laybach, in which the river Laybach joins it on its right bank. The river then runs eastward till it reaches the boundary, along which it runs in a south-easterly direction till it enters Croatia a few miles below its junction with the Gark, which passes Neustadl. The Iszno (the ancient Esonus) rises on the southern slope of Mount Terglou, from which it runs south-east through the eastern part of Carniola and 12 miles south of the town of Sautal; at a distance above Aquileia the Iszno divides into two branches, the Issonato and the Sodbo, which inclose the isle of Morosina, and after their re-union enter the Gulf of Trieste. The principal feeders of the Iszno are, on the right, the Torre, which drains a part of the province of Friuli, and on the left the Idria and the Wippach, both of which flow in a north-west direction, the former passing the town of Idria and entering the Iszno above Canal, the latter falling into the sea between the Mont Drava and the Iszno. The Iszno is subject to inundations on the melting of the snow in spring and after the autumnal rains. The Save is navigable in Carniola, and a river-port has been formed at the mouth of the Save, which is navigable by vessels of small size. The Iszno formed part of the eastern boundary of Italy under the French empire. The Laybach, above mentioned, rises near the south-east corner of the crownland, and runs through a deep valley to the border of Croatia, where it is navigated by means of small boats.
Adelberg under the name of Poll: this stream loses itself in the grotto of Adelberg and reappears in the Uns, which again sinks below the surface, but reappears at the village of Ober-Laybach, where it becomes navigable for boats. The remarkable Lake of Cirkinitz, or Zirkinitz, is noticed in a separate article.

The crownland is divided into 10 circles. With the exception of Laybach and Idria the towns are small. Laybach, or Lay, the capital of the crownland, is situated in 46° 2' N. latitude, and 13° 4' E. longitude, and separated from Vienna by the Vienna-Trieste railway; in an extensive valley near the mouth of the navigable river Laybach, which divides the city into two parts, connected by five bridges; and has with its suburbs about 15,000 inhabitants. It is administered by a mayor, five aldermen; and has a town council, two churches, a lyceum, a gymnasmium, and many other public institutions. The chief industrial products of Laybach are porcelain, linen, and refined sugar; there is an active transit trade, also to Trieste, in which direct railway is in course of construction. The citadel, situated on a commanding eminence, is now used as a prison. At a short distance to the north of the town there is a stone bridge of 11 arches, 540 paces in length, over the Save. Laybach is the educational centre of the crownland.

The other towns are Stein, which gives its name to the Steiner Alps, from the summits of which, 10,274 feet above the level of the sea, there is a magnificent prospect over Carniola; Kainzburg, with the castle of Kesselstein; Neumarkt, where there are revolutionary and constitutional pamphlets, f. c.: none of these towns have so many as 2000 inhabitants.

Neustadt, the capital of a circle, is beautifully situated on the river Gurk, 35 miles E.S.E. from Laybach. It is a very pretty regularly-built town, with three churches of a gymnasium, a Franciscan convent, and about 5000 inhabitants.

The other only place of importance is Idria, a mining town, famous for its quicksilver mines, which were accidentally discovered by a peasant in the year 1497. It is situated partly at the bottom of a fertile valley, partly on high mountains, 22 miles W. from Laybach, on the banks of the little river Idria, and partly on several low hills, of which that called Mount Calvary is distinguished by its height and picturesque form. The town is inhabited by 400 and 500 houses, and has about 5000 inhabitants, who subsist partly by lace-making and straw-plaiting; but the greater part are employed in the mines and works. A large building called Schloss, in the middle of the town, contains the offices of the manager of the mines; close to it is the entrance to the mine by a large iron gate, which opens to a horizontal passage hewn in the solid rock, leading to a flight of 707 steps, ent in the limestone rock, which are kept in perfect order and provided with a hand-rail. At the foot of this staircase there is a basin and large vats in which the miners perform their deviations before they proceed into the mine, and where a couple of tapers burning on the altar help to cheer the gloom that reigns in these subterranean caverns. The church of the Schloas, or Casel church, contains many baroque altars running in all directions, and would soon be bewildered in the labyrinth without a guide. This mine is one of the greatest curiosities in the Austrian empire, and unequalled for the order, beauty, and safety which are remarked in every part. The notions exhalations of the quicksilver, which sensibly affect respiration, and the enflaming heat, soon make the visitor anxious to return to the light of day, to which he ascends by a perpendicular shaft in a height of 220 feet. The famous mine town of Zirknitz, in earth, at a great distance from the spot at which he entered. The deepest depth of the mine is 750 feet. About 100 tons of mercury are produced annually. The stamping-mills, washing-houses, furnaces, and roasting-houses for the refining of the mercurial ore are at a short distance below the town. Besides the quicksilver-works there is a manufacture of cinnamon, which produces 1800 cwts. annually. In the vicinity there are marble, Jasper, and freestone. All the establishments for smelting, refining, &c., are admirably arranged, and the building is elegant. A little above, in a hollow, is a small town whose health is most dreadfully impaired by the detestable atmosphere in which they ply their sickly trade. These mines, the groottes of Adelberg, and the Lake of Cirkinitz, are the principal sources of Idria's wealth.

Carniola was, until the political arrangement of the Austrian empire in 1849, divided into the three circles of Laybach, Neustadt, and Adelberg, which corresponded with the older divisions of Upper, Lower, and Inner Carnia respectively, and formed the government of Laybach. Krain was early inhabited by a people of Slavonic stock, and formed in the 10th century an independent magistrature, which at a later period the dukes of Austria and Carinthia divided between them, and which was raised in the 12th century to a dukedom, which the Duchy of Tyrol in 1335 fell to the Earl of Görz, from whom it came, through failure of male issue, to the house of Austria in 1861. By the treaty of Vienna in 1809 Krain was ceded to France, for the benefit of the Illyrian provinces. In 1813 it again came into the possession of Austria, and formed part of the kingdom of Illyria. [Ilytma.] Krasinski, Count Valerian, was a native of the ancient Polish province of White Russia, and was descended from a noble Polish family. He was educated at a very early age, and early embraced at an early period the Protestant faith, to which he adhered. He received a superior classical education, and while yet a young man was appointed chief of that department of the ministry of public instruction in the kingdom of Poland which was charged with the superintendence of the various classes of dissenters. He was zealous in his endeavors to promote instruction among them, and especially exerted himself in the establishment of a college at Warsaw for the education of the peasantry. In 1821 he married a lady of the family of Laybach, and removed to Carniola, where he resided during the first twenty years of his exiile, and during the last five in Edinburgh, where he died December 22d, 1855. He was a man of varied learning, and possessed a correct, concise, and forcible style of expression, especially on all matters connected with the Slavonic races. His conversation was instructive and his manners elegant, and he was admitted to the best society.

His most important works are the following: 'The Rise, Progress, and Decline of the Reformation in Poland,' 3 vols, 8vo, 1829-40; 'Panasiavism and Germanism,' 12mo, London, 1848; 'Lectures on the Religious History of the Slavonic Nations,' 8vo, London, 1849; 'Sketch of the Religious History of the Slavonic Nations,' 8vo, Edinb., 1851; 'Montenegro and the King of Montenegro in Prose, and 'A Treatise on Relics, by J. Calvin, newly translated from the French Original, with an Introductory Dissertation on the Miraculous Images of the Roman Catholic and Russo-Greek Church.' His principal works are pamphlets on current political subjects, especially on those connected with the restoration of Poland.

Krokydolite. [Mineralogy, S. L.] Kugler, Franz Theodor, Professor of the History of Art in the Royal Academy, Berlin, was born on the 19th of January 1806, at Berlin in Pomerania. On the completion of his collegiate studies Herr Kugler especially devoted his attention to the early history of painting and architecture, and prepared himself for a purpose which has led him to the study of ancient and subsequently visited Italy. Poetry and music also occupied much of his attention, and he in 1830 gave evidence of his attainments in these arts by the publication of his 'Sketch Book,' in which he included original compositions in poetry, music, and linear design; it was published with Reinick an artist's song-book. But the more important as well as the most numerous of his writings about this time were those on the history of art during the middle ages; though the arts of ancient Greece and Rome (and particularly the art of Constantinople) have also been treated with interest. He published 'Uber die Polychromie der griechischen Architektur und Sculptur und ihre Grenzen,' 4to, Berlin, 1835) also engaged his pen. His great work the 'Handbuch der Geschichte der Bildenden Kuenste' (1829-51) was published. 'History of Constantine to the Present Time' appeared in 3 vols. in 1837. It was received with great approbation by his learned contemporaries and by students of art generally, and was quickly translated into the leading languages of Europe. In
LABUAN, an island in the Malay Archipelago, and the seat of a British colonial government, is situated on the north-east coast of the island of Borneo, and 30 miles N. from the town of Borneo, in 5° 32' N. lat., 115° 10' E. long. The island is about 10 miles in length, 5 miles in breadth, and 25 miles in circumference. The population in 1856 was 46,966. The island is well supplied with good water, and contains coal. It was ceded to the British in 1846, and the colonial government was established on it at the beginning of October 1848.

The locality on which the government establishment was formed consists of a narrow and slightly raised ridge on the sea-shore, forming the outer edge of a low flat, called the Plain, which is in many parts below the level of the sea, and was converted into a marsh during the rains. The area of the Plain probably does not exceed 100 acres. It is bounded on the inland side by swampy tracts of jungle. The harbour is tolerably good. The unhealthiness of the marshy ground in the Plain has been considerably abated in consequence of the construction of a canal, by which the water is carried off.

The coal is wrought on the north-east coast of the island. The mines have been taken by the Eastern Archipelago Company, which in 1851 exported 6032 tons of coal, of which a large part was supplied to vessels belonging to the British navy. During 1862 and 1863 they employed 280 Zels (aborigines) and negroes, at a remuneration of 65s. per man per month, and cleared outwards 27, of an aggregate burden of 5635 tons. The imports in 1852 were valued at 30,970£; the exports at 16,542£, the principal exports were:—Coal, 5643£; sago, 2879£; bird's-nests, 1937£; pearls, 1805£; and camphor, 1659£. The principal item of revenue is the royalty on coal. Farm licences are increasing in value, improved rentals being obtained at each succeeding sale.

LACHMANN, KARL, professor in the University of Berlin, and member of the Academy of Sciences, occupied a high rank among the critics and philologists of Germany. He was born at Brunswick on the 4th of March 1793. In that year he received his early education under his teacher, Konrad Heusinger, who was then one of the most celebrated practical grammarians of Germany. In 1811, Lachmann was the first among the younger men who directed Lechmann's attention more particularly to it, and he was afterwards much more critical upon it and upon many of the early Greek writers. During the short war occasioned by Bonaparte's return from Elba to France in 1815, Lachmann served as a volunteer in the Prussian service, in which he continued till the end of that year. In the spring of 1816 he was appointed as a lecturer at Göttingen, was published at Leipzig; and at Easter of that year he read his probationary essay before the University of Berlin. "Ueber die urprüngliche Gestalt des Gedichts von der Niebelungen Notd'" (On the Original Form of the Poem on the Niebelungen Calamities). After this he was appointed, in rapid succession, teacher at the Gymnasium and professor at the University of Königsberg, and professor of the University of Berlin, the last promotion being attained in 1827. Highly esteemed as an academic teacher, and sedulous in the discharge of his duties, he nevertheless actively continued his literary labours. Many of these were critical or philosophical essays contributed to periodical works. Of his distinct works, the more important have been "Die Geschichtedes der Greco-Romanischen Literatur (vom bald der Germanischen bis auf die altorientalischen," which are both masterly specimens of criticism. His last was the substance of two lectures delivered before the Berlin Academy in 1838 and 1841. In 1844 and in 1842 he published two editions of the New Testament, the last with the Vulgate translation, in which he endeavoured to restore the text to that of the 3rd and 4th centuries. In the classical department he published: "De Choricis Systematis Tragicorum Graec., Berlin, 1819;" and "De Memoria Tragediorum," Berlin, 1828; with carefully-prepared editions of Catullus, Tibullus, Terence, Bœbrus, and Avianus, at intervals from 1829 to 1845; one of Oisias, so important to the students of the Roman jurisprudence, in 1841; and essays upon Deuthers and Ulpian in the ninth volume of his "Geschichtedes" of the Roman Law, published in 1826. Most of his works have gone through more than one edition. His attention however was never diverted from the early literature of the north of Europe. In 1816 he translated the first volume of P. E. Müller's "Sagabibluthet," in 1830 a selection from the High-German poets of the 13th century; in 1836 an edition of the "Niebelungen Lied"; in 1837 an edition of the poems of Walther der Vogelwede; in the same year, in conjunction with Benecke, an edition of Hartmann's "Twain;" in 1833, an edition of the poems of Wolfram von Eschenbach; in 1838, Hartmann's "Gregor," and the poems of Ulrich von Liechtenstein, 1841. These were all prepared with great care, and accompanied with valuable remarks. He also contributed numerous papers to the "Zeitschrift für die gesammten Wissenschaften der Alterthümer" of the Berlin Academy. The most noticeable are "Ueber altdeutsche Bettonung und Verkunst," (On the early High German Accents and Verkunst.) And," Ueber Singen und Sagen," and "Ueber das Hildebrandlied." He also published an excellent critical edition of Lessing's collected works, in 13 vols., Berlin, 1838-40; and an edition of Kleines's "Philologische Essays." Lachmann is likewise the author of a translation of Shakspere's sonnets, published in 1820; and of "Macbeth," published in 1850. He died in March 1851.
the system of the Abbé Lamennais, and to explain that it combined the advocacy of the interests of the Roman Catholic Church, and the defence of liberal opinions in connection with it; and to maintain that religion, so long neglected, and suffered to decline by the upper classes, ought to be, and might be replaced by the people, if the government were so disposed. This was a complete separation of the spiritual from the temporal power, insisting that political influences ought to be transferred to the multitude by means of the press and of public meetings, expressed in a style of eloquence, somewhat biblical in form, and unanswerable.力 produced, upon an excitable people an effect so manifest as to provoke the censure of Rome, in the form of an encyclical letter, of the 18th of September 1832. Having received a gracious letter of congratulation from the pontiff on the 30th of December.

But in May 1834, the new champion of independence in Church matters produced his most admired book, the *Paroles d'un Croyant,* a pathetic lamentation, addressed alike to the suffering classes, and to the great and powerful; a work which so tended for ever the bond that united Lamennais to the see of Rome. Irritated by this new provocation, Gregory XVI, in a last despatch dated January 1834, but superseding his journal, had received a gracious letter of congratulation from the pontiff on the 30th of December.

In this book he denounces the materialism propagated by the philosophers of the 18th century, and bitterly deplored the apotheosis induced to religion. His vocation being the Church, he found the Church, of his own sect, in 1811; and in 1812, in concert with his brother, published his *Tradition de l'Église sur l'Institution des Évêques.* As the power of Napoleon I. was dissolving, and the times seemed propitious for the diffusion of unfettered thought, he went to Paris in 1824, where, for many years, he declined his father's repeated offers to settle him in some mercantile office, and in 1807 found means to enter the college of Saint-Malo, as teacher of mathematics.

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LAM.

LAM.

LAPORT.

LANTERN-FLY.

LANTHANUM.

LAR.

LARDIBALAGE,

LARDIZABAL,

LARDWICK,

LARNE.

LAUNCH.

LARDON.

LARDEN.

LANS.

LANCASHIRE.

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and published in vol. ix. of their 'Transactions,' consists of a
description of the geological strata of that district
of the Highlands of Scotland. In 1830 Sir T. D. Leader
published an 'Account of the Floods of August 1829
in the Province of Inverness.' In 1845 Dick Leader
married in 1826, and had issue two sons and seven daughters.
He died May 23, 1848, at his residence, the Grange, near
Edinburgh, and was succeeded by his son, Sir John Dick Leader,
who was born 1/5, 1797, and in 1845 Sir T. D. Leader
deputed lieutenant of the counties of Haddington and Egin,
and a Fellow of the Royal Society.

LAUREL. [Laurus.]

LAURIC OR LAURI CARIACIC. [CHEMISTRY. S. 2.]

LAVENDILAN. [MATERIALIOY. S. 1.]

LAVENHAM. [SOPHOLK.]

LAW, CRIMINAL. Upwards of 65,000L has been spent on
various commissions, which have been issued during the
last thirty years for the consolidation or codification of the
criminal law. These works, though not yet attained, may
have not really practical measures been adopted for such an
annual revision of our statutes as would in a few years
naturally produce their consolidation, if not a codification of
the same. The present state of the Legislature and the
impotence of the House of Commons will before long compel
the passing of general acts consolidating and so far codifying
the criminal law; on this ground it is desirable to abstain
from any attempt to enumerate those alterations in details
which have been made. One of two points only need be
referred to. The summary jurisdiction recently
conferred on magistrates in petty sessions is noticed under
LACENY, S. 2; the liability of trustees to prosecution for
breach of duty, under the head TRUSTS, S. 2. Great improve-
ments were effected in the procedures of the courts which
take cognizance of crimes by the statute 14 & 15 Vict.
c. 100, which abolished all technical objections for misnomers
or nondescriptions, and invested the judges with ample
powers of amendment. Finally, transportation as a punish-
ment to be ordered by the court has been abolished by the
statute 20 & 21 Vict. c. 3. Penal Servitude, as it is termed,
created by statute 16 & 17 Vict. c. 99, has been substituted;
but criminals sentenced to long terms of penal servitude
continued to be sentenced under the old laws.

LAW, EDWARD. [ELEEBERDON. LORD, S. 3.]

LAYBACH. [KAIN, S. 2.]

LEASE. The lease for a year [LEASE AND RELEASE,
'Penny Cyclopaedia,' vol. xiv., p. 376] is no longer used in
counselling in the release coming in place of it. (4 & 5 Vict. c. 21.)

LEATHERHEAD. [SURREY.]

LECANCHIC. [CHEMISTRY. S. 2.]

LECHLAEDE. [GLOUCESTERSHIRE.]

LEE, REV. SAMUEL, D.D., was born May 14, 1763,
at Longnor, a village in Shropshire, about eighteen miles
from Shrewsbury. He received the rudiments of education
at a charity-school in that village, where, at the age of twelve
years, he was apprenticed to a carver. At the age of seventeen he formed a determination to learn
the Latin language, and though he had at first only six shillings
a week, and afterwards seven, to subsist on, he contrived to buy
rudimentary books and then classical writers, and the
benefit of his apprenticeship had accomplished his purpose.
He then determined to learn the Greek, and this he also
accomplished. The Hebrew, Chaldaic, and Syriac languages
were next mastered. When in his twenty-fifth year he
removed to London, he engaged in the part of his
employers repairing of a house, in which however
a fire broke out, when he lost all his tools, and was reduced
to extreme poverty. In the meantime the Rev. Archdeacon
Corbett had heard of his studies and abilities, saw him at Longnor,
left him a legacy of 100L, and appointed him in promotion.
In the course of a few months he acquired the Arabic and Persian
languages, and afterwards a tolerable knowledge of French,
German, and Italian. For two or three years previously to
1813 Mr. Lee held the mastership of Bowdener's foundation
school in Shrewsbury. In 1813 he left Shrewsbury, and
obtained an engagement with the Church Missionary Society.
In the same year he entered himself of Queen's College,
Cambridge, and in 1817 took his degree of B.A. Having
received one of the scholarships of the University, he was admitted
at Shrewsbury a sermon in aid of the funds of the Shropshire
Auxiliary Bible Society.

On the 11th of March 1819 Mr. Lee was elected Arabic
Professor of the University of Cambridge, but not having
been at College the time requisite for taking that degree
of M.A. (which was necessary before he took the chair), a grace
was passed the senate to request the Prince-Regent to grant a
mandamus, which was obtained accordingly. In 1828 the
degree of M.A. was conferred upon him. He obtained the
degree of D.D. In 1833 he was appointed chaplain to the
jail at Cambridge, and in 1835 was presented to the
rectory of Bilton with Horrowgate. He took the degree of
D.D. in 1837, and in 1831 he elected Regius Professor of
Hebrew to the University of Cambridge, and with that
accompanied canonry in the cathedral of Bristol.
The degree of D.D. was conferred upon him by
the University of Cambridge in 1833. He was afterwards presented to the
rectory of Barley in Hertfordshire. He died on the 16th of
December, 1853, at Barley rectory. He was twice married.

Among the more important of Dr. Lee's works are the
following:- Hebrew Grammar,' 1830; 'Travels of Ibn
Batuta, translated from the Arabic,' 1853; 'The Book of
Krain, translated from the Chaldaico, and English Lexicon,' 1840; 'An Inquiry into
the Nature, Progress, and End of Prophecy, Svo, Cambridge,
1849; 'The Events and Times of the Visions of Daniel and
St. John,' London, 1850; 'The Hermit's Tale,' a poem; in 1796 'Almeida, Queen of
Granada,' a tragedy, which was successfully performed, Mrs.
Siddons sustaining the principal character. In 1806 it
was published in six volumes, a novel entitled 'The Life of a
Lover,' which is said to have been her earliest production, and the
effort of her girlish years, and is certainly one of the
weakest of her writings. Her last work was a comedy, performed
at Drury Lane Theatre in 1804, called 'Asignation,' which
was condemned on the first night, and was never published.
Her chief of her poems is 'The Canterbury Tales,' of which she
furnished two, 'The Young Lady's Tale,' and 'The Clergyman's Tale,' which
occupy a volume and a half of the five volumes to which the series
extended; and she wrote the introduction to the whole.
These tales are certainly superior to her novels, but they are not
equal on the whole to those of her sister.

Harriet's first appearance as an author was in 1786, when
'The Errors of Innocence,' a novel in five volumes, was
published; this work was continued on the part of her
Peage; or, Our Eyes may deceave us,' 'Clara Lennox,' a
novel in two volumes, in 1797, and 'The Mysterious
Marriage, or the Heirship of Rosalia,' a play, in 1798; all
have been forgotten. The Canterbury Tales included
successive volumes, the first in 1797, the fifth and last in
1806; they were so immediately popular that second edition of the
first two volumes were published in 1799. They consist
of twelve tales, of which one, 'The German Tale—
Krutznitze,' furnished Lord Byron with the idea of
"Z"
the materials for his tragedy of 'Werner,' and he says of the tale that he had formed a 'high estimate of the singular power of mind and conception which it develops.' It is universally admitted that his lines are full of beauty and imagination, and that the work contains the most definitely drawn characters, and a well-developed plot. Several of the other tales however show a considerable knowledge of the human mind, are unexceptionable in their genre, pleasingly, and are narrated in a simple and unaffected style.

LEERSIA, a genus of Grasses belonging to the tribe 

Oryeae. It has 2 paleae compressed, keeled, and awnless, the lower one much broader; stigmas protruding from the side of the fruit, in the manner of the genus anemone, the plant is:

I. oryzaeetides has a patent paniere with wavy branches, spikelets triandrous, half oval, ciliated on the back. It is a creeping stem with a spine one to two feet high, never procur- blement, and rooting at the joints. The leaves are broad and rather firm, the 3rd horizontal one, the 4th verting a straw- reason; panicle rarely, if ever, protruded in this country, mostly inclosed in the sheath of the uppermost leaf. It is found in marsh ditches in Sussex and Hampshire.

LEFWARD ISLANDS. The British Leeward Islands, in the West Indies, form a distinct government, which includes the islands of Antigua, St. Christopher's, Anguilla, Montser- ret, the Virgin Islands, Nevis, and Dominica.

LEIGH. [Lancashire.]

LEIXLIP, county of Kildare, Ireland, a small town finely situated at the junction of the Rye with the Liffey, 11 miles W. from Dublin, by road and railway from Dublin to Galway; population, 332. It consists of a single street. The parish cloth has given a note of Gothic style, and has a chapel. The Liffey is here crossed by a bridge. Above the town is Leixlip castle, built by Adam de Hereford, one of Strongbow's followers. A little way beyond the castle the Liffey forms a fine cascade, called the Salmon Leap. The town is a place of resort on account of the beau- tiful scenery near it. Fairs are held in May, July, and October.

LEK, JOHN, architectural engraver, was born in 1784, in Sun-street, Bishopsgate, London, where his father was a manufacturer of pewter; and to him the youth was in the first instance apprenticed, but disliking the business, he was at the age of seventeen transferred as a pupil to Mr. James Basire, an eminent architectural engraver, and remained with him four years. Le Keux formed himself, how- ever, a true and bolder style than that of his master, and eventually in the engraving of gothic architecture attained an excellence equalled by few in the profession. Indeed, it would be difficult to say that his gothic architecture was for the first time thoroughly well engraved in this country by him; and that his engravings did much to render the study of gothic architecture popular. He possessed a very consid- erable acquaintance with both the general principles and the details of gothic architecture, and his engravings displayed, not only minute correctness, but that 'feeling,' as artists term it, which is always an evidence that the work is executed as a matter of enjoyment, and not merely as a task. Le Keux was in fact an artist and not a mechanic, and even the admirable architectural drawings of MacKenzie lost nothing in fidelity, and sometimes, perhaps, gained a little in spirit, under the rendering of Le Keux's burin. The first important work we believe on which Le Keux was engaged was 'Britton's Architectural Antiquities of England,' and he also engraved much of 'Britton's Cathed- ral Antiquities,' and other of Mr. Britton's works; the elder Puin's 'Architectural Antiquities of Normandy,' 'Gothic Specimens,' and 'Gothic Specimens of Westminster Abbey,' and 'Churches' (vol. I.); 'The Oxford Antiquities,' and lately the 'Memorials of Oxford,' and 'Memorials of Cambridge,' both of which were projected by himself and executed with much elegance, though of course from their smaller scale, as well as length, less freedom than his larger works. Mr. Le Keux died April 2, 1846. His eldest son, J. H. Le Keux, has a high reputation as an architectural engraver.

LELLE [Vigrem.]

LEP. [Mineralogy, &c.]

LEO. [Lym.]

LEONHARDITE. [Mineralogy, &c.]

LEPIDOGASTER, a genus of fishes belonging to the Subbrachial Malacopterygii, and to the family Cycloptorida, or Discopoda. [L.]

This genus of fish is distinguished by its smooth body without scales; dorsal and anal fins opposite and near the tail; pectoral fins large, descending to the inferior surface of the body, and by an extension of the membrane surrounding an oval disc; ventral disc contains a single opening, which is large, situated in the belly, and extends obliquely to the sides, at the anterior end of the oval disc. This fish is occasionally taken on the coasts of Antrim and Clare in Ireland. This fish is small, a specimen described by Mr. Conch not being more than two inches and a half in length. It adheres with its snacker to almost any substance presented to it, and is a most troublesome animal to the Angler. The individual fish is a pale flesh-colour, with spots and patches of carmine about the upper and under surface of the jaws, around the eyes, on the top of the head, sides of the body, and abdomen.

LEPIGONATUS, the Bimaculated Sucker, is a seced British species. This fish is rarer than the last. It has been taken on the southern coasts of Great Britain. It seldom exceeds three-quarters of an inch in length. Its general colour is a tawny red, pale flesh-colour underneath, with a light-coloured patch between the eyes, and sometimes inclined to some variation in the markings: the two spots on the sides not always very obvious. It lives in deeper water than the last species.

LEPILODICTYON, a genus of plants belonging to the family Cy- cladaceae. It is closely related to the genus *Monora*, to which the Common Cob belongs. The substrata are united with the nasal bone, and form a depressed muscle, advancing before the mouth, which however retains its mobility, and is crossed by small blood vessels. The ear- rinals are a little on the throat; the pectoral of most size; the first dorsal high; the second dorsal, anal, and cardinal united; the jaws short; the teeth fine and short. The fish is sometimes met with in the sea, and utters grumbling noise when taken out of the water. Two species are known. They inhabit the Mediterranean and Atlantic.

LEPIDOLITE. [Mica, &c.]

LEPIDOMELANE. [Mica, &c.]

LEPIDOSTROBI. [Mica, &c.]

LEPIDOSTROBIUS. [Mica, &c.]

LEPIDOSTROBIUS. [S.]

LEPIDOTITTUS. [Mica, &c.]

LEPIDOTITTUS. [S.]

LEPIDODENDRON. [Mineralogy, &c.]

LEPIDODENDRON. [S.]

LEPIDOPTERA. The order of small insects, which includes the Lepidoptera, or butterfly insects.
3. The two preceding considerations are secondary to the remaining one—the nature of the contents of the cones. There may be stamens or male organs—ovaria or female ones—or, lastly, capsules containing reproductive spores (which are peculiar to plants having no sexual system). For these three kinds of spores all occur arranged in the form of cones, indistinguishable from one another by any external marks. Up to the present time no carboniferous fossil cone has ever been known to supply this great desideratum, without which we cannot reach the most conclusive assertion as to whether these curious objects are clusters of flowers or fruits, or are the spore-bearing organs of flowerless vegetables, as mentioned above.

Specimens of Lepidodendron are mostly found in seams of nodules of clay-iron-stone, and are very highly mineralised, sometimes containing crystals of iron, and the cavities in their substance being filled with white carbonate of lime and magnesia. Those which are most complete always form the nuclei to nodules of clay-iron-stone; others again, including all in which the spores are preserved, have occurred as broken frustules within stems of Lepidodendra elegans and other species of that genus. Usually the fragments of Lepidodendron are not more than half an inch long, and very frequently are mere cones, or stems arranged in these ways. In some instances, one or two fragments of the fragment of Lepidodendron, it will generally be found that this is owing to two being placed each at an extremity of the truncheon, and opposite to one another. [See Figure, page 482.] On the other hand, it cannot be doubted, for no modern cone of any natural order could be broken up into the shallow discus which many of these fossils present. It is difficult to account for the presence of these fragments of Lepidodendron in the stems of Lepidodendron; we must therefore conclude that these stems, whose interior was hollowed out by decay—that these stems were covered with water in which were fragments of Lepidodendron and other vegetable matter, which were introduced into the stumps. This supposition is founded on the following considerations—

1. The stumps of Lepidodendron appear to have been rooted and erect, and to have received the cone fragments into their cavity as fern fronds find their way into the axis of Sigillaria. Where the stumps were prismatic portions of stems it is evident that cones would have lain horizontally in them, and that no washing or drifting could have induced the fragments of these cones to lie with their axes parallel to them, or could have introduced so many into one stump; and the latter notion cannot have been materially conveyed had they received on one side the pressure of the impermeable schistose mud.

2. The stumps must have been submerged, and the fragments of the stumps lying submerged may be in due manner brought to be washed off into the stumps. This supposition is confirmed by the non-interference of the cones, and their uniformly vertical position with respect to the Lepidodendron.

It is hard to account for the accession of so large a volume of water as would submerge these stumps and deposit these fragments, and yet exhibit no signs of drifting in its course. The sudden fall of a tropical torrent of rain on a Lepidodendron forest, in which were hollow stumps of these trees, must have been a great event, of which the fragments of the Lepidodendron from the trees and float up the fragments on the ground, depositing them together in the stumps. Another effect of such a fall would be to break down some of the older trees whose decaying stumps would be prepared to inclose other Lepidodendron on the precipitation of the next similar torrent.

The extreme fragility of the Lepidodendron displayed by these specimens is very satisfactory, as the Lepidodendrons, of which they are the fruit, do not partake of this character; the deposit, the composition and intimate union with the silt or mud which is the basis of the clay-ironstone in the one case, and the formation of a homogeneous bed of vegetable material, each in another. The extreme abundance of the fragments too suggests a most vigorous vegetation, for they must indeed have been profusely scattered to be deposited in such numbers within narrow cylinders into which no current appears to have been directed.

It is worthy of remark that no fern-leaves are contained in any of these Lepidodendron stems; and their absence is not more striking than is that of these being commonly deposited along with branches of Calamites, &c., in the erect stumps of Sigillaria resting on the coal-shales. This is no doubt connected with the well-known fact of the Sigillaria stumps being filled with sandstone, or the same which are the tints; in the stumps the stumps, or other plants to the same spot. The perfect preservation in which these fragments occur must be attributed to the protection afforded them by the surrounding Lepidodendron bark. That the circumstance of the latter has been subjected to pressure may be inferred from the flattening of the prominences to which the leaves were attached. This pressure was moreover very considerable, as may be proved by comparing the evenness of their surface with that of a piece of earth containing a fossilised without preservation, and imbedded within the stem along with the Lepidodendron.

If these cones be examined with reference to the known contemporaneous fossils which accompany them, it will appear impossible to deny their having the reproductive organs of modern conifers. There is no resemblance whatever to the cones of Lepidodendron, Lepidodendron and other species of that genus, because the arrangement of the tissue in the axis of the cone entirely agrees with that of the stem of Lepidodendron. Just as we find in modern cones of Lepidodendron and other species that the axis is a continuation of the trunk, of which it is the interior portion, and its organs adapted to support and protect the parts of fructification. The most positive evidence that can be adduced of Lepidodendron belonging to a genus allied to Lycopodium is afforded by the spore, the presence of which is another, as may be inferred from the existence of the spores and of the affinities of the plants which produced them. Accordingly we find that Dr. Lindley, the first English observer who published any extended views on the affinities of these plants, suggests the probability of their being referred to a genus without spores, or at most very probable still to Cycadea. Dr. Hooker, after describing the nature of sporious cones which have no relation to the reproductive organs of the plant, as in the common cone-bearing willow, or the beech (as a proof of the nature of some), and the various cones of Lepidodendron and other species of this order, it is impossible to say that the cone of Lepidodendron is formed without an imbrication of its parts, as in a genus inhabiting Tierra del Fuego, where a cone is formed by this means from a leaf, says:—"Some of the so-called Lepidodendron may be of this nature: witness the Lepidodendron obelia, of which it is impossible to say whether it is formed from leaves or cones."

L. incurratus has a cylindrical subulate spike; 2 glumes equalling or slightly longer than the flowers; stem from 5 to 6 inches long; spike long, covered with a rich variety of this species, L. fitiformis, the spikes are much more slender, filiform, scarcely at all curved. It grows in sandy salt-marshes.

LENN H. [Botanical Cyclopedia.] The following by Dr. Baird, an examination of the British species of the Lenzend, or Lennards:—

Tribe I.—Anchorastomateae.

Females.—Attached to their prey by means of their foot-jaws, which are stout and armed with strong hooks. One pair of antennae; generally very distinct. Thoracic feet 2 2 Z
nearly rudimentary, or represented by appendages of considerable size, but differing in form from ordinary feet.

Males.—Free and unattached; very small, and differing totally in appearance from the females.

Family Chondracanthidae.

Organs representing thoracic feet, in form of considerable-sized, cartilaginous-looking, not articulated appendages; generally three pairs in number. Three pairs of foot-jaws.

Genus 1.—Chondracanthus.

Two pairs of foot-jaws prehensile, the third nearly rudimentary. Appendages of thorax representing the feet, in form of large digitations, but not articulated, and not setiferous lobes or tubercles. Oviferous tubes very short, broad, and flattened.

C. Zei. Body short, and rather thick. Head rounded; antenna short, and rather broad; neck narrow, short. The thorax carries on the underside two pairs of small appendages, each consisting of three divisions or fingers, and furnished laterally with three pairs of longer prolongations, of many divisions, the terminal one on each side larger than the other. Thorax conical, divided into five segments, part of the thorax is covered with short, conical, sharp-pointed spines. Abdomen rudimentary. Oviferous sacs flattened, containing many small ova.

It is found adhering to the gills of the Zeus faber.

Genus 2.—Lernentoma.

Foot-jaws and thoracic appendages as in Chondracanthus. Oviferous tubes long, either club-shaped and stout or slender and twisting.

1. L. cornuta. Female.—Head oval, rather elongated; antenna flattened, of considerable size, and projecting. Thorax elongated, club-shaped; anterior portion narrow for about a third of its length, the other two-thirds much broader, and terminating posteriorly in two sharp lateral tubercles, of moderate length, and a third one representing the abdomen, which is nearly quite rudimentary. Two pairs only of thoracic appendages are visible, occurring at the upper portion of the narrow part, each divided into two digitations, and situated at a short distance from each other. The ovaries situated on the sides, cylindrical, and about two-thirds the length of the body. Length nearly 3 lines.

Male.—Somewhat pyriform in shape. Head very large, swollen, and projecting from the touch, representing the thorax, and terminated by a rudimentary abdomen armed with two small hooks. Antenna slender, setaceous, projecting from the anterior extremity of the head, and underneath them a pair of hook-shaped foot-jaws. Mouth situated far back, and provided with mandibles, which is behind the mouth two other pairs of foot-jaws are visible. Following these we observe two pairs of setiferous tubercles representing the feet. Length, a quarter of a line.

It is found in the form of a sole.

2. L. costata. Female.—Body somewhat square-shaped. Head small, and situated at the end of a long and slender neck; it is rounded at the anterior extremity, and a little below the antenna exhibits on each side a round lobe or tubercle. The antenna and foot-jaws are very small. The neck nearly equals in length the rest of the body. The thorax is broad, and of a somewhat quadrangular shape, with a deep indentation on each side about the middle of its length. On the upper half we see two pairs of prolongations or ctenidial tubes, divided into three digitations, and on the lower half there are three smaller appendages, bastiate, not digitated. The posterior angles of the thorax are prolonged also into short horns or appendages, which are also simple. The abdomen is in form of a short tubercle, with a rounded posterior point. The oviferous sacs are of about the length of the whole animal, of considerable size, and cylindrical.

The male is similar, according to Milne-Edwards, to that of Chondracanthus (Lernentoma) cornuta.

It is found attached to the caudal spine of the Triplet.

3. L. longipapillata. Female.—Body rather elongate, and somewhat gibbons. Head small, having on each side a small horn-shaped appendage directed a little obliquely backwards. Antenna small, conical, and slightly curved. Thorax divided into four portions by as many contractions. The first narrow like a neck, having, on the upper portion a short spine, and on the under surface a pair of appendages or prolongations of two divisions or digitations; the second is somewhat quadrilateral, with on the middle line of the back two conical tubercles and on the sides two others, the upper pair of the longest, having on the under surface a pair of appendages of two digitations; the third part is larger than the preceding, and has the same tubercles and prolongations, and in addition a small spine on the superior portion, and in the mesial line of the under surface; the fourth portion is rather the largest, with two horns or tubercles on the upper surface, a third on the median line of the under surface, and on each side a long terminal prolongation, rather blunt. Abdomen in form of a short tubercle in the centre of the posterior angle, and bearing two pairs of foot-jaws of slender, and twisted. Length, 65 lines; breadth 23 lines.

The male is very similar to that of the Chondracanthus cornutus already described.

It is found on the Lophius piscatorius, in the poncho.

Tribe II.—Anchoracanthaceae.

Attached to their prey by means of two long appendages which arise from the thorax. They unite together either at the base or near the tip. Only one terminus in a round knob like a button, by means of which the animal maintains its hold of the part to which it has attached itself.

No thoracic feet, or they are represented by these arm-shaped appendages.

Many are slightly differ very much in appearance from the females, being greatly smaller and unattached.

Family 1.—Lernopodidae.

Arm-shaped appendages long, wide apart from each other at their base, and united only at the tip.

Genus Lernopoda.

Female.—Body generally elongated, oval. Head short and thick. Two pairs of foot-jaws, well-developed, are placed near each other. External ovaries of moderate length and cylindrical.

Male.—Body divided into two nearly equal portions of an ovoid shape; one representing the head, the other the thorax.

Much smaller than the female.

1. L. elongata. The head is very distinct, of a hairy texture, ovate, depressed, broad at the base, and obsolescent, present in form, resembling very much the shape of the body of the common Spider-Crab. The second pair of foot-jaws is large and well developed, consisting of a large rounded oval basal joint, and a more slender curved hooked terminal one, with a pretty strong tooth on its inner edge. The head is united to the body by a short narrow neck; the thorax is divided, forming a somewhat small hook. From the thorax we give origin to two long cylindrical arms, which considerably exceed the length of the body. At the posterior portion, which is somewhat truncate, we see two small lobes; and on each side of these springs the ovaries, which are about the length of the end of the head, thick, straight, and cylindrical.

Length of the whole animal nearly 3 inches. Head, one line and three-quarters. Body, 74 lines. Arses, one inch and one line and a half. Ovaries, one inch and one line and a half.

A specimen of this arctic species was found attached to the eye of a shark caught on the coast of England, and brought to London in the winter of 1848.

2. L. galei. Female.—The head is oval, depressed, and of a hard horny substance; the thorax is long, rather slender, and somewhat cylindrical, narrow where it is attached to the head, and broader, and more obtuse posteriorly. The arms are slender, and nearly the length of the thorax. At the posterior extremity of the body are two small lobes, between which, on the middle line, is a small tubercle representing the abdomen. Ovarian tubes of moderate length, not quite equal to the length of the thorax.

Length of the whole body, including arms, about three-fourths of an inch.

Male.—Body divided into two portions, of an oval form, and nearly of equal size; the upper half represents the head, and being united to the body representing the thorax, arms, and pair of antenna, and bears on the sides of foot-jaws of much considerable magnitude; the lower half, representing the thorax, has at its posterior extremity two sub-globular appendages a little longer than those in the female.

Mr. Ham was found attached to the cavity posteriorly to the vent of the Squilla galea.

3. L. Salmonis. Linnaeus's description of this species, as
far as it goes, is very good — "Body ovate; thorax obcordate; the two arms linear, approximated." The head is rather small, somewhat longging out at the back part, broader there, and rather sharp pointed at the anterior extremity. From the base of the head spring the two arms, which are rounded, and slightly shorter than the body. The thorax is pyriform and short, and at its base there are two minute eminences. The ovary tubes are of considerable thickness, cylindrical, and about the same length as the whole animal.

The colour of the animal is white. Length about half an inch.

It is found in the gills of the Salmon, in the London markets.

Family II. — Anchorellaeidae.

Arm-shaped appendages very short, and united to each other from the base, so as to resemble a single organ.

Genus Anchorella.

Female. — Body in general short, and somewhat swollen. Head small, and situated at the extremity of a long neck, which is generally curved backwards. Two pairs of foot-jaws well developed, and a third rudimentary. Antennae rudimentary. Ovarian tubes of moderate length, and cylindrical.

The female differs in appearance very much from the female, and is very small.

1. A. uncinita. Female. — The body of the animal is thick, olbong, of a milk-white colour, smooth, and opaque. Head very small, situated at the extremity of a long slender neck, which has a wrinkled appearance, and is nearly the length of the thorax. The arms spring from the upper part of the thorax, and are rather short, terminating in a rounded knob or button. At the posterior portion of the thorax there is on the middle line a small protuberance representing the abdomen. The ovarian tubes are cylindrical, straight, smooth, and about the length of the body. Length from 6 to 8 lines.

Male. — Body globular, terminated in front by a small conical eminence, at the extremity of which is the mouth, and having at its base one pair rudimentary appendages, and a pair of rudimentary foot-jaws. On the middle of the body, on the inferior surface, there are two pairs of large book-d-claw-like members. Length, one-fourth of a line.

The female fixes itself to the fins and gill-cover of the Cod and Haddock, and is most probably the most common species of our seas. (Johnston.)

2. A. rugosa. Body nearly of a square shape, a little emarginated on each side. Head small; neck slender, and nearly cylindrical. A rounded tubercle on the middle line represents the abdomen. Ovaries rather larger than the thorax, nearly cylindrical, or slightly club-shaped. Length, about 3 lines.

Found in the mouth of the Gadus callarias.

Tries III. — Anchorellaconi.

Females. — Attached to their prey by the anterior extremity of their body only, thrusting the entire head into the tissues of the animal to which they adhere, and being retained there by means of a kind of horns, which are various in form, and spring from the posterior part of the head. No antennae. Only one pair of foot-jaws, which is simple and hooked. Feet either very small or often wanting altogether.

Males. — Very small. Body globular, and more imperfect than in the preceding tribes, having no distinct thorax, and no rudiments of feet behind the appendages which represent the foot-jaws.

Family I. — Peniidae.

Several pairs of feet situated on the under surface of the body near the head, but very small and rudimentary.

Genus Lernocera.

Body long, slender, narrowed anteriorly in the form of a neck, which is terminated by a swollen head furnished with two or three simple curved horn-shaped appendages. Abdominal portion of the body of considerable length, and simple. Oviferous tubes long and slender.

1. L. sprupta, the Eye-Sucker. Body slender, considerably larger than the ovaries. A pair of tolerable size, rounded, and provided with two narrow rather hooked horns at its back part, directed backwards. The head is connected to the body by means of a long and very slender cylindrical neck, which is furnished with about a dozen constrictions, each of which makes the part of the body appear as if it were beset with an equal number of rings or knobs.

A short distance beneath the head it is very narrow, gradually increasing in size as it joins the body. Abdominal appendages are of a yellowish hue, and obliquely truncate. The ovary tubes are very long and slender, about as long again as the whole body of the animal. Length of the body about an inch; ovaries one inch and a half.

It is found attached to the eyes of Sprats.

2. L. artificialis. Body cylindrical, shorter than the preceding, and about the same size at both extremities. The neck is long and slender, quite smooth, and destitute of the constrictions which mark so decidedly the preceding species. The neck is white, and the body is of a brown handy colour.

The abdomen is like that of the preceding, and the ovarian tubes are long and slender, at least twice the length of the body. Turton describes the ovaries as "clear white." Perhaps they may be so in the living animal, but in the specimens preserved in spirits they are of exactly the same colour as the body. In one specimen however one of the tubes is broken, and the ova have escaped, and in this the tube is white. Length of the body about half an inch; ovaries fully one inch in length.

It is found attached to the bodies of the Chapea encrasico- lus and C. spraptus.

Family II. — Lernoceradea.

No vestiges of feet on under surface of body, nor any appendages representing them.

Genus 1. — Lernocera.

Body long and slender; head furnished with horn-shaped appendages, which are simple and symmetrical in form. Ovarian tubes straight, and of moderate length. Abdomen very small.

L. opirinac. Head furnished with four horn-shaped appendages, which are somewhat long and slender. The two outer or posterior are bifurcated; the anterior simple.

The thorax is very slender anteriorly, forming a long neck, but becomes much broader posteriorly, and when it terminates in the small abdomen appears obliquely truncate. The oviferous tubes are cylindrical, and rather long. The length of the whole animal is about 8 lines.

It is found on the sides of the Carp, Bream, and Roach, in many of our ponds and rivers, in great abundance.

Genus 2. — Lernes.

Body more or less twisted, and out of appearance. Head furnished with horn-shaped appendages, which are irregularly branched. Ovarian tubes twisted into round masses, and placed under the posterior portion of the body. Abdomen of considerable size.

The genus Lernes is now restricted within very small limits. Established by Linnaeus upon the L. branchiata, it is at the present day confined to that species and one or two others.

L. branchiata. Head rounded, and furnished with three horn-shaped appendages, each of which is divided at the tip into three short branches.

The anterior portion of the thorax is long, cylindrical, and very slender, like a long narrow neck, while the body itself is very much swollen in the middle, and abruptly twisted upon itself in the form of the letter S.

The abdomen is very long, blunt at the extremity, and of considerable size. The oviferous tubes are slender and very much twisted.

The whole animal is about an inch and a half in length, and is of a very firm consistence, being hard and horny.

It is found on the gills of the Cod. ( Baird, History of British Entomatares; Milne-Edwards, Histoire Naturelle des Crustacés.)
S58 was 1861. The Olen-Swilly at a and 23°.
The scene of Glen-Swilly above Letterkenny, and of Long Swilly, the best pictorial area of Glen-Swilly, has declared itself an independent state, and carried in the affirmative.
A convention was then appointed to draw up a constitution, and on the 24th of August, 1847, the flag of the Independent Republic of Liberia was raised in ceremony.
The chief events in the history of the settlement have been the numerous encounters with the natives, and since its independence the visits of the president to England and America with a view to the arranging of certain treaties. The republic was recognised by England as an independent state soon after its declaration of indipendence, and has since been recognised by France, Prussia, Brazil, and some other powers, but not by the United States.

The coast of Liberia has a general direction north-west and south-east, and is broken by several bays and coves of which those formed by Cape Mount, Cape Mesurado, and Bassa Cove are of much value as harbours. The greatest part of the coast is low and sandy, or marshy; but about Cape Mesurado the coast becomes more elevated, and eastward the shore is considerably elevated. Between these points however there is a low continuous beach of light brown sand, backed by an unbroken tract of forest. Towards the south-eastern extremity the coast is in many parts b-hl and rocky, and the cliffs in many places are broken into a large part of the sea, with large irregular blocks of granite on the beach, over which the sea breaks heavily, and many rocks lie a short distance off the shore; but between the higher parts everywhere occur long stretches of low sandy beach, in many places bordered by sand-banks; and so near as a large coast it is necessary for the mariner to keep a sharp lookout.

From the coast the land rises for the most part gradually towards the interior. About 20 or 30 miles from the shore is a succession of hills covered with a dense undergrowth, and the rest of the lower country, with forests, rising farther inland into mountain ridges, and divided by wide and fertile valleys. The river is numerous, and some of them are good-sized streams; but all have their mouths obstructed, and some entirely closed, by sand banks, and are only navigable by canoes; some of them appear to be navigable far inland. The chief river is the St. Paul, which falls into the sea by Cape Mesurado. The sand-banks at its mouth leave only a narrow channel for boats within a few feet of water at it low tide. It is about 40 miles in length, while wide 40 or 50 feet, and in some of its mouths its body of water, flows through an extremely fertile valley, and has along its banks numerous native villages as well as settlements of the Liberians; but its course is greatly obstructed by rapids; boats of light draught can only ascend it for about 25 miles. The other most important streams are the St. John, which falls into the sea at Bassa Cove; the Jab, which lies between the St. Paul and St. John, and has a very narrow channel through the bar at its mouth; the Cape Mesurado, which is obstructed, and the Dolo, which has its entrance almost closed by a narrow spit of sand; the Grand Cessos, some distance eastward; and the Dolo, still farther east, which has about 6 feet of water over its bar, descending inside to 4 or 5 feet.

The climate is hot and oppressive. During the dry season, which lasts from May to November, the temperature averages 85°; but in the wet season it falls to 75° or 74°. The extreme heat is alleviated by gentle breezes, which blow daily from the sea. Should the barometer fall too low for comfort, the American climate is very prejudicial; but the negro colonists, though the descendants of families long settled in America, have experienced no inconvenience from it after they have passed through the seasoning, or acclimatization for which they have been exposed. They are comparatively seldom fatal in its attacks. Nothing like an epidemic has ever appeared in Liberia.

The following brief extract from an Address of the
The colonists have erected a lighthouse on Cape Palms, which shows a fixed light 100 feet above the sea. There are two or three villages at the mouth of the river.

The constitution, adopted at the declaration of the independence of Liberia, and said to have been drawn up by Professor Greenleaf, of Harvard College, Massachusetts, is founded on that of the United States, which it greatly resembles in political arrangements. It is independent of all men; establishes perfect religious freedom, and the liberty of the press; prohibits slavery; gives the right of every one to be tried by a jury of his peers, of bail, and of habeas corpus; makes no all offices elective, and gives the suffrage to every male above 21 years of age. Its capital is a grant of five acres of land, with liberty to purchase more. The executive government is vested in a senate elected from the counties, and a house of representatives elected after the American system, according to a ratio of representative population; and a president pro tempore elected for two years, is to exercise supreme executive power, is the commander-in-chief of the army and navy, and has a qualified veto on the acts of the legislature. The judicature consists of a supreme court, chief-justice, and district judges, appointed by the president on a vote of two-thirds of the houses of legislature. The annual revenue and expenditure average about 7000£ a year each. The republic appears to be making steady progress.

Liberia is divided into the counties of Monrovia, or Montserrat, Bassa, and Sinoe. The chief town is Monrovia, or Montserrat, which took up his situation at the mouth of the river, as the principal place of trade. It contains a court-house, a public library, two or three churches and schools; several stores, warehouses, and good wharves; a fort and a lighthouse; and has about 1800 inhabitants. The other larger towns lie on the banks of the river, Monrovia being at the mouth, and on the right bank of the Junk River; Edina and Great Bassa at the mouth, but on the opposite banks of the St. John, in Bassa Cove; Bexley, and the new town of Cressen on the same neighborhood; Greenville on the Sinoe; Trade Town, a populous place 4 miles W. from Youngest; and Cestos, or St. George's Point in Cestos Bay. The chief inland towns and settlements are Caldwell on the St. Paul; New Georgia, and Millburg. Along the coast are several factories, chiefly for the trade in camwood, belonging to Libarians, and some to English and American merchants; and both along the coast and inland are numerous native towns and villages, some of them, as Grand Cestos and Great Neeboo, of considerable size.

On Cape Palms, the south-eastern extremity of Liberia, is established the colony of Maryland-in-Liberia, consisting of free-coloured emigrants sent thither from the state of Maryland by the State Colonisation Society. The colony was settled in 1834, and a tolerable number of free-coloured persons have since been sent to it by the Society, which is assisted in its operations by an annual grant from the state legislature of 20,000 dollars. The colony, which is independent of Liberia, is governed by an agent, or govern- nor, and his council; a major-general, a council and other officers elected by the colonists; and appears to be in a tolerably flourishing condition. Harper, the chief town, contains about 700 inhabitants, and carries on a good deal of trade. The Palmas River is about a hundred yards wide towards its mouth, but several rocks lie in the channel; it has a depth of 3 feet over the bar at low water.
with England, into a grievous mistake. It is only too true that there are more books in Paris than in London, but this is a matter of proportion to the number of inhabitants

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of the two cities; in Paris, estimated at between twelve and fourteen thousand inhabitants, and in London, between eighty and eighty-five thousand. But it is not true that there are more books in Russia and Hungary, in Portugal and Spain, in the United States of North America, than in Holland and England. It is not even true that there are more books available to the working classes in any of the countries named than in England. There are coffee-houses in the by-streets of London which have larger libraries than can be found in the cities of from five to ten

and fifteen thousand inhabitants in Germany or Denmark. There are divans in the Strand where more papers and reviews are taken in than in the Casino of Prato. In fact, with the exception of the United States of North America, no nation in the world has so many books, so much literature, in proportion to the amount of the population, as England. In Spain, in Italy, and Germany, even in France, very few persons have private libraries in their own houses. In England a house is not considered furnished without a stock of books. Even the cottage of the peasant has its family Bible, and its copy of Shakespeare or Milton, a thing having no parallel in some of the countries standing higher in the above list. It is ill supplied by foreigners, they in England are of no pictures. It is much the same with regard to books. But the fact is, both our art and our literature are gathered up in our houses; while in public collections we are lamentably deficient, but only in public collections.

As a nation, as a community, in small quantities, and in many houses, it has its evils as well as its virtues. It induces a certain amount of reading in the classes to whom literature is chiefly a graceful recreation; but the education of the classes into which literature is not to a sufficient extent, so far as I could gather from the records of letters, is the case in France, how the number of letters, surnamed by the most deplorably. Within the reach of men of letters, living there was no library in London, accessible to the public, even moderately complete in the great departments of inquiry. Gibson had to purchase all the books necessary for the composition of his great works. Fortunately for us he had the means. Roscoe was unable to obtain from any public library in Liverpool the ordinary Italian authors whom he had to consult on the subject of his biographies. Still later, the historian of North America (Graham) found himself obliged to remove from London to Göttingen, in order to get access to a wellstored library, which was at the same time open to the public. Within a year or two of our own time, Robert Southey was obliged to collect at his own cost all the materials of his voluminous writings, as any other author would have to do again next year, if we were inconvenient for him to reside in London, and to attend at the British Museum in the heart of the day. How disastrous is the scarcity of books, publicly accessible, upon the present topic of the number of letters is seen, in any example, let any of the reading rooms, day after day, of the British Museum and the National Library in Paris, he will at once perceive that two distinct classes of persons frequent these rooms. In London he will find only men of letters and artists, the teachers of the people. In Paris he will observe that it is the people themselves who come to read. In the British Museum he sees only grave men and women dressed in the customary suits of sober black, so well befitting the vocations of letters. In the National Library of France there are observed men from the civil and military college, soldiers of the guards, officers, clergymen, shopkeepers, porters, and generally speaking speaking semiclasses of all classes of the population. A deep sound of the over the shoulder of the readers in the two rooms will reveal another difference between them. In London, you see the tables covered with old volumes, maps, and manuscripts — the literature of the past. In Paris, you notice that the readers are chiefly poring over the new books and newspapers — the present. This, of course, is an absolute — Louis Blanc — the living literature of their own age. In Paris, there is only a library of reference; the Parisian institution is a library for reading.

In Paris there are 7 open Public Libraries.

In Brussels there are 2

In Berlin there are 2

In Milan there are 2

In London there are none.

Compared with the population of these cities thus provided — the whole of them little over-counting London alone — the facilities for mental culture afforded to our masses are not to be named. Indeed all the collections of books which can by any straining of the terms of their acts of foundation be considered as public libraries are wretchedly inadequate to meet the wants of a population pining for a higher class of reading matter. A man who feels this need has recourse to the British Museum — the library of Sion College, in London Wall, founded by Dr. White, in 1636, and now containing nearly 40,000 volumes; the library in Red Cross Street, founded by Dr. Williams, now containing 50,000 volumes; and Archbishop Tenison's library in Westminster, containing about 4000 volumes. This last is now degraded to the purposes of a club-room. These are all public libraries, a card of admission is obtained in much the same way as at the British Museum. Of course there are many more libraries in London to which men of letters obtain access for the objects of their craft as the library of the East India House in Leadenhall Street; the libraries of the Inns of Court; libraries connected with the various professional colleges; the library of Lambeth Palace; and so on. There is none of these can the books be borrowed. None of them are open to the general public, or to the unknown student. The only decent library in London from which books may be taken home is a subscription library in St. James's, whose catalogue is imperfect in all departments, and is moreover barricaded by a large entrance fee.

Out of London, the Bodleian at Oxford, and the University Library at Cambridge, are the best in England. But these are only to the learned class; and not only so, but to the majority of the students themselves. It is the same in the University Library in Glasgow. At Trinity College, Dublin, at the University Library of Aberdeen, and at that of St. Andrews, the same is the case. These are private libraries, and are not open to the public. Chetham's library, in Manchester, containing about 20,000 volumes, has the reputation of being the only one in England open to the public after the manner of the Conti-
west. In Dublin, there are four other decent libraries in addition of that of Trinity College—belonging respectively to the Royal Irish Academy, 10,000 volumes; to the Royal Dublin Society, 19,000 volumes; to the Queen's Inn, and Marsh's Library, 18,000 volumes. The Advocates' Library in Edinburgh is the chief public collection of books in the east of Scotland.

Besides these great collections, which are known but not easily accessible to the general public, there are a consider- able number of smaller libraries, scattered all over the country, which are not known nor accessible—but which may constitute the nuclei of a system of public libraries by and bye. These little- known collections consist of two kinds of libraries and parochial libraries. Of the former, there are known 34 in England and 6 in Ireland. For the most part they are stocked with works on theology and divinity, but some of them have also works on literature and history—particularly ecclesiastical history. Many of these have incomes settled upon them by pious and munificent found- ers. In such places, new books are added yearly; the number of volumes which they contain will average from 7000 to 10,000 in each. In some the books have had little care taken of them, but in others they are in fair condition for the public. Generally speaking, these church libraries are the closest of corporations. Parochial libraries once prevailed to a considerable extent throughout England and Wales, and Scotland; but now, through the rapid growth of the working classes, there are not less than 183 such institutions in England and Wales, and 16 in Scotland. These parish libraries were founded in the first instance by private benevolence. Many of them owed their origin to the efforts of Dr. Bray and his friends, the founders of the Clergy of the Established Church, at the beginning of the 18th century; but others had already been in existence some time, as we learn from the preamble to an Act of Parliament for their better preservation, passed in 1708. Many of these libraries, from sheer neglect, have fallen into a state of decay, and are in need of serious reform, at the beginning of the 19th century; but others had already been in existence some time, as we learn from the preamble to an Act of Parliament for their better preservation, passed in 1708. Many of these libraries, from sheer neglect, have fallen into a state of decay, and are in need of serious reform, at the beginning of the 18th century; but others had already been in existence some time, as we learn from the preamble to an Act of Parliament for their better preservation, passed in 1708. Many of these libraries, from sheer neglect, have fallen into a state of decay, and are in need of serious reform, at the beginning of the 18th century; but others had already been in existence some time, as we learn from the preamble to an Act of Parliament for their better preservation, passed in 1708. 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from the more intercourse of daily life at Thorn, where I was much neglected; and that if I were made professor I should myself be obliged to begin to learn the language anew from the first rudiments. In the course of 1792, however, Linde received the appointment, and began to do as he had said. Among the books that he procured from Poland as the Polis Poles of Paris, or Poles of Vienna, the satirical play, directed against the national failings of the Poles, which he found so excellent, that, though many passages were beyond his comprehension, he commenced a translation, with the intention of making it the original, or as a book for study with his pupils. I was lying on his table when two Polish gentlemen called on him, whose attention was at once attracted by the book, and he asked them if they could inform him who was the author of that unusual work. One of them, Niemieczwicz, replied, "I wrote it." "That moment," Linde afterwards said, "was the decisive moment of my life." Niemieczwicz became his intimate friend, explained to him the passages that had perplexed him, and introduced him to the society of the other distinguished Poles then living at Leipzig, to which it appears the professor had hitherto had no access. Among them were the Counts Potocki, Kellotaja, and Thaddæus Kociszewski, some of the most illustrious names of Poland at that period. The first had been driven from the lips of gentlemen and scholars, became fired with enthusiasm for the Polish language, and resolved to devote himself to the production of a great Polish dictionary. He took this resolution at the age of twenty-two; he published the last volume of it seven years later, after, as he wrote, he had worked at it almost unremittingly during the interval. The Dictionary of the Polish Language, 'Słownik Języka Polskiego,' occupies six quarto volumes, of which the first was published at Warsaw in 1807, and the last in 1831. It fills about five thousand quarto pages in closely printed double columns; to every word is appended an explanation in Polish and German, a comparison with the forms which resemble it in the other Slavonic dialects, and a collection of passages in which the word is used. The whole was read by Linde through six or seven hundred of the principal words in Polish, of which he gives a list in the first volume. It was the first great dictionary of the Polish language; it has served as the basis for every subsequent one, and, though of course susceptible of improvement and augmentations, it is not likely to be ever either superseded or surpassed. In the course of its preparation Linde soon resigned the professorship at Leipzig which had first given rise to it, passed some time at Warsaw, then became librarian to Count Osolinski at Vienna, and had the congenial employment of travelling in Poland to collect Polish books, by which he enriched the library and his Dictionary together, and lastly established himself in Warsaw, where he superintended the printing, which was carried on in his own house by a commissary with whom he had the privilege of immuniizing themselves by affixing their own names at the end. These labours were carried on during a stormy period, but the house in which the printing was conducted was not surrounded by.tending armies, and the author received support from the Russian and the Austrian governments, and in particular from the Russian, as well as from numerous Polish magistrates, one of whom, Count Zamoysky, when the works were on one occasion brought to a stand by an absolute want of pecuniary means, sold a favourite horse and sent the proceeds to the lexicographer. Linde held various appointments connected with the educational establishments of Poland, and was even first librarian of the University of Krakow, and resided at Warsaw as rector of the Lyceum and principal librarian of the university, during the long period of comparative tranquillity which preceded the insurrection of 1830; and though he was elected to the revolutionary diet as member for Praga, was avowed to that unfortunate movement, which he thought ill-timed and likely to issue in nothing but calamity. Fryxell the Swedish historian, who, in his travels in search of Swedish documents, was surprised to discover that Linde was the author of a history of his own countrymen, found him depressed and melancholy in the year 1834. "It was instructive," says Fryxell, in the preface to his 'Handlings rörande Scandinavien Historia,' "to hear him talk in the reasons of Poland's fall first and foremost in the national decay of the Schwedes themselves, and in instructive especially for a Swede, who belongs to a country which has the same powerful and wily neighbour that Poland had, and who bears the same misleading doctrines preached around him which ended in subjugating Poland to the Russian yoke." Linde at that time been re-appointed by the Russian government to some of the educational posts he formerly held; but he resigned them in 1838, and appears to have lived in retirement till his death on the 8th of August 1847 at Warsaw. In addition to his Dictionary he was the author of the 'Przygody Potockich,' a novel published in 1829, and the 'Polish Grammar,' which has been very generally adopted in Poland, and to whom he has been most familiar. The most important of those was his translation (Warsaw, 1829) of the Dissertation on Kolubeck, the old Polish historian, by his friend and patron Count Osolinski, who it should be mentioned assisted materially in the preparation of it, and to whom in conjunction with Prince Czartoryski, also a munificent patron, that work is dedicated.
southern Europe and Great Britain. It has linear glabrous leaves, corymbose heads, the involucral lacinia; the stem from 12 to 18 inches high, simple and leafy; leaves single ribbed, smooth or scarios, very numerous, more or less dotted; flowers yellow. It grows on limestone cliffs. It is the

LINSENERZ. [Mineralogy, S. 1.]

LINTON. [Lancashire.]

LISTA Y ARAGON, ALBERTO, an eminent Spanish mathematician, was born at Seville, in 1776, on the 16th of October, the day which, as he delighted to remember, was also the birthday of his favorite poet Virgil. His parents were in humble circumstances, and engaged in silk-weaving, and in his early years taught the children in their family. When he was eleven years old, he displayed such talents for mathematics, that by the time he was thirteen he was already enabled to earn his own living by giving lessons to pupils. As he went about from one house to another for this purpose, he filled up the intervals by playing with the other boys in the streets. At fifteen he was made teacher of mathematics in the schools of the society of 'Amigos del Pais,' and at twenty nominated by the king to the same office in the nautical college of San Telmo at the seaport of Buenos Ayres. At the age of twenty, and being in Seville enthusiastic in their devotion to literature and intimate personal friends, Arjona, Reynoso, Lista, and Don Jose Maria Blanco, afterwards so well known in England by the name of Linton.

In 1808, soon after Lista's appointment to the professorship of poetry and rhetoric at the University of Seville, the French invasion brought ruin to every literary circle in the peninsula. Lista at first joined with Blanco in continuing the 'Censor,' but latterly there were four young men's papers that was composed also by Lista and his associate called 'El Censor,' one of the best periodicals of Spain has ever produced. In 1822 he published his poems, with a dedication to Blanco White, the name of 'Abino.' They at once placed their author among the first poets of modern Spain. Not long after his publication of a sort of private college at Madrid, the reputation of which was singularly high, and had the effect of exposing him to many annoyances on the part of the government. Among the pupils of Lista at different periods of his life are found the names of Duran, Mercado, and Jerez de la Vega, Rosas de Togores, and many others of peculiar eminence. He became dispirited by the obstacles thrown in his way by the authorities, that he finally left the country and established himself at Bayona in Spain, which supported him by its circulation in Spain till it was prohibited by the ministry. He then went to reside at Paris, and while there paid a visit of a fortnight to London, for the exclusive purpose of renewing his intercourse with his old friends. In 1820, he was minister of the Church of England, resident at Oxford. When the friends met their emotion was so great that both were for some time unable to speak. Soon after, in 1833, the writer whose 'Gaceta de España' he founded, and who brought out for the first time a daily newspaper in Spain, was unwilling to edit the 'Gaceta de Madrid,' by which his leading articles were so highly approved; that King Ferdinand offered him in recompense the bishopric of Astorga, which he declined in favour of his friend Torres Aguirre. He afterwards demonstrated the necessity of his life flowed through a series of honours. When in 1837 he resigned the editorship of the 'Gaceta,' he became professor of Mathematics at Madrid, and helped to establish the Athenaeum, or university there. His health suffered by the climate of Madrid, and he removed to Cadiz, where he superintended the new college of St. Philip Neri. In 1840 he gave this up, and returned to his native Seville, on his road to which he was met at two leagues off by a procession of friends with many honours. Torrellas, Eacogidos, Lista, and a collection of selected extracts, 'Trastornos Espafiola en Prosa y verso.' But the French invasion brought ruin to every literary circle in the peninsula. Lista at first joined with Blanco in continuing the 'Censor,' but latterly there were four young men's papers that was composed also by Lista and his associate called 'El Censor,' one of the best periodicals of Spain has ever produced. In 1822 he published his poems, with a dedication to Blanco White, the name of 'Abino.' They at once placed their author among the first poets of modern Spain. Not long after his publication of a sort of private college at Madrid, the reputation of which was singularly high, and had the effect of exposing him to many annoyances on the part of the government. Among the pupils of Lista at different periods of his life are found the names of Duran, Mercado, and Jerez de la Vega, Rosas de Togores, and many others of peculiar eminence. He became dispirited by the obstacles thrown in his way by the authorities, that he finally left the country and established himself at Bayona in Spain, which supported him by its circulation in Spain till it was prohibited by the ministry. He then went to reside at Paris, and while there paid a visit of a fortnight to London, for the exclusive purpose of renewing his intercourse with his old friends. In 1820, he was minister of the Church of England, resident at Oxford. When the friends met their emotion was so great that both were for some time unable to speak. Soon after, in 1833, the writer whose 'Gaceta de España' he founded, and who brought out for the first time a daily newspaper in Spain, was unwilling to edit the 'Gaceta de Madrid,' by which his leading articles were so highly approved; that King Ferdinand offered him in recompense the bishopric of Astorga, which he declined in favour of his friend Torres Aguirre. He afterwards demonstrated the necessity of his life flowed through a series of honours. When in 1837 he resigned the editorship of the 'Gaceta,' he became professor of Mathematics at Madrid, and helped to establish the
LOCHMABEN. [DUMFRIESSHIRE.]
LOCKER, EDWARD HAWKE, was the son of Admiral Locker, to whom Nelson, soon after the battle of the Nile, presented a New Year's gift. His friend, then in the New Year's gift acquainted, knew that a valuable service could be rendered to him in the acquisition of knowledge, that no useful book was to him, and that a valuable service could be rendered to him in the acquisition of knowledge, that no useful book was to be had. He had been educated at Eton, and had entered in the year 1756, and received an appointment in the Navy Pay Office. He remained in government offices till 1800, when he went to India as private secretary to Lord Elphinstone. From that time to the peace of 1814, he was associated with that distinguished commander in arduous and confidential duties, superintending the affairs of the major ports of the Mediterranean, and for his efficiency and able discharge, which discharged with eminent ability. In his official capacity he visited Napoleon at Elba in May 1814; of which visit he published an interesting narrative after the death of the Emperor. Mr. Locker married the daughter of an eminent antiquary and philologist, the Rev. Jonathan Boucher, the author of a 'Provincial Glossary,' the publication of which from the posthumous manuscript commenced in 1829, but which has not been continued beyond the letter R. Mr. Locker resided at Windsor from 1815 to 1819, when he was appointed secretary to Greenwich Hospital. During his residence at Windsor his attention was called to an article in 'The Windsor Express,' in which was pointed out the deplorable want of books adapted to the large number of young people in the surrounding schools, and for many years he devoted large portions of his leisure to the promotion of education in National and other schools. Mr. Locker sought the acquaintance of the writer of that article, Mr. Charles Knight, then the editor of the Windsor paper; and they together projected and jointly edited 'The Plain Englishman,' almost the first, not the very first of any literary pretension, of those cheap and popular miscellanies which the growing ability of the great bulk of the people to read imperatively demanded, in the place of miscellaneous or childish tracts. Those of the friends of education, such as the present Archbishop of Canterbury, were among its contributors. Mr. Locker's own papers in the miscellany are excellent models of popular writing—plain, energetic, affecting. His articles on the Bible and Liturgy, which have been reprinted in a series of sermons delivered to the Crew of the Caledonia, Lord Exmouth's flag-ship, are admirable examples of clear exposition and earnest exhortation. Mr. Locker, after filling for several years the important duties of secretary to Greenwich Hospital, became the Resident Civil Commissioner of that great institution. The improvements which he introduced into its management were results of his active and comprehensive mind. Of these improvements the Naval Schools are striking instances. Himself an accomplished draughtsman and an ardent lover of the arts, he founded the Naval Gallery at Greenwich by his judicious exertions. In 1844 Mr. Locker's health so failed that he gave up his valuable appointment and retired upon a small pension, his fine faculties outweighed beyond the hope of recovery. Mr. Locker was the intimate friend of many distinguished men amongst his contemporaries. To use Mr. Lockhart's expression, he was an old and dear friend of Scott's. He died on the 10th of October 1849.

LOCKERTIE.

LOCKHART, JOHN GIBSON, was born in 1794 at the manse of Cambushan, in Lanarkshire, Scotland; his father, who was of an old Lanarkshire family, being then minister of Cambushan, in Lanarkshire, was a member of the Established, or Presbyterian, Church of Scotland. His mother was related to the celebrated family of the Erskines. When Lockhart was two years of age, his father removed from Cambushan to become one of the city clergymen of Glasgow; and his talents were shown during his course at the Glasgow University; at the end of which, while still only in his sixteenth year, he obtained, by the unanimous voice of the professors, the Snell exhibition to Balliol College, Oxford, at the early age of 17, which he began to study with a zeal and ardour which have never been surpassed by any eminent Scotchmen have been trained. In 1813 he took honours as a first-class man in classics; and in 1817 he graduated B. C. L. at the university—a degree exchanged for the higher one of Doctor of Laws. After his graduation, he, with many, and acquiring the language and seeing much of the literary society there, he settled in Edinburgh as a member of the Scottish bar in 1816. He never had much practice as a lawyer however, but from the first devoted himself to literature, and has since made up for his few years, with those who, with Wilson as their chief, were then beginning to dispute the literary supremacy of the Scotch Whigs, as represented by Jeffrey and the 'Edinburgh Review.' When Blackwood started his magazine in 1817, Lockhart, the young Scot, wrote for it, and after a short while, with a considerable number of the famous 'Chaldee Manuscript' and of the earlier 'Necatos Amorosianos' papers were written by Lockhart, though Wilson afterwards made the magazine his own. It was in consequence of Lockhart's literary connection with Blackwood and Scottish Toryism that he became acquainted with Scott, who looked with a kindly interest on the efforts of those young men of the same politics as himself. The first meeting of Scott and Lockhart took place in 1818, and from that time until Scott's death in 1832, they were almost inseparable, and it was Lockhart 'the gallant and adventurous' who spent a prolific period in Lockhart's literary career. He wrote his translations of 'Spanish Ballads' for 'Blackwood,' afterwards published collectively; in 1821 he published anonymously his 'Valerius, a Roman Story;' in 3 vols.; this was followed in 1822 by 'Adam Blair, a Story of Scottish Life,' in 1 vol.; by 'Reginald Dalton, a Story of English University Life,' in 3 vols., 1823; and 'Matthew Welford,' in 1 vol., 1824, each showing great power in a peculiar vein; and in 1825 he wrote 'The Roman of Aragon,' a life of Charles III, remembered 'Life of Napoleon,' for 'Constable's Miscellany.'

In 1826 Lockhart removed to London to succeed Gifford in the editorship of the 'Quarterly Review.' He continued to edit the 'Review' in 1827, and succeeded the late Mr. Aubrey. In his hands the 'Review' maintained and increased its reputation; and not a few of the most powerful articles that appeared in it during the seven-and-twenty years of his editorship, came from his own pen. He was particularly happy in biographical sketches, combined with criticism. One paper of this kind—that on 'Theodore Hook'—has been reprinted by itself.

On Scott's death in 1832, the task of writing his biography naturally devolved on his son-in-law Lockhart. The task was accomplished in 1837-39, when the voluminous 'Life of Scott' was given complete to the world. Those portions of the work which related to the fall of Scott's pecuniary fortunes, provoked some controversy at the time; but the work as a whole has taken rank as one of the most interesting and admirable biographies in the language. It has been said by those who knew Lockhart, that such was his practical sagacity that, had his illustrious father-in-law had the benefit of his actual assistance in the management of his affairs, the calamities which ruined Scott towards the close of his life could certainly never have happened.

In 1849 Lockhart was appointed by Sir Robert Peel to the office of auditor of the Duchy of Cornwall, with a salary of £1,500. In addition to this and his large literary income he had inherited some small property in very easy circumstances. His last years however were embittered by a series of bereavements. His eldest son, the 'Hugh Littlejohn' of 'The Tales of a Grandfather,' had died in early life; his second son, and surviving son died at a later period; and there remained only
corolla; and in this expedition he was again severely wounded. In 1803 he became full colonel, and aide-de-camp to his Majesty, and for a short time occupied the post of adjutant-secretary of the Household.

He was also appointed by the British sovereign to attend to the court of St. James, and was present at the coronation of the Emperor of Russia, and also at the coronation of the Emperor of France, under which circumstances he was required to assist in the service of Lord Castlereagh, with whom he maintained an intimate and constant correspondence during the whole of his later years. He was a constant attendant on the Emperor of Russia, and was present at the coronation of the Emperor of France, under which circumstances he was required to assist in the service of Lord Castlereagh, with whom he maintained an intimate and constant correspondence during the whole of his later years.

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ing an elongated body, with dorsal fins and one anal fin, a
chin with one or more barbules.
L. molea, the Ling, is a very valuable fish, scarcely less
so than the Cod. Its quantities are taken in the Western
Islands, the Orkneys, on the Yorkshire coast, and the
Scilly Islands; and may be traced nearly all round the
Irish coast. The fishing for them is by hand-lines and
long-lines; and besides a portion that is consumed fresh, the
fish are mostly kept in salt, either in brine, washed, and
dried, or used in brine are sold to be used for attracting fish.
The liver produces oil, which is used by the poor to supply the
cottage lamp, also as a medicine. In Zetland the principal fishing
for Ling is from May to August. On the Yorkshire coast
the young are called Drizelles. In Cornwall they are caught in
January and February, and their favourite haunt are the
mouths of the rocky valleys of the ocean.

The Ling is exceedingly prolific, and has a most voracious
appetite, feeding on young fish, not sparing anything that
has a head or a tail, and a maw or a beak. In that no previous
art is required to catch it. It is tenacious of life, and sur-
vives great injury. Mr. Conch says he once saw a Ling that
had swallowed the usual large hook, shaft foremost, of which
the line was fastened to the stomach, and as it turned round,
it entered the opposite side of the stomach and fastened the organ together in complicated folds; yet having escaped by breaking the line, it survived to swallow another book, and was taken several days after.

The most usual length of the Ling is from three to four
feet; Pennant mentions having heard of one which measured seven feet; and Mr. Conch has known them weigh 70 lbs.

The body of the Ling is slender, more elongated than that of the Hake; roundish; head flat; gape large, lower jaw
shorter than the upper, with a single barbule at its ex-
tremity; teeth in the upper jaw small, and very numerous,
those in the lower jaw longer and larger, forming a but
a single row; lateral line straight, scales small, firmly adhe-
sing to the skin; two dorsal fins of equal height, the first
short, commencing near the head, not pointed as in the Hake,
but with most of the rays even; second long, im-
mediately behind the first, reaching nearly to the caudal;
their tips being the most elevated, but not in a line forming
the eighth or ninth ray of the second dorsal fin; the fin im-
nediately behind it is long, resembling the second dorsal fin,
and terminating on the same line with it; caudal rounded at
the upper edge, back and sides yellow, grading to olive;
sometimes cuneous without the lower anal having dusky
belly silvery; ventrals white; dorsal and anal edged with
white; caudal marked near the end with a transverse black
bar; the extreme tip white.

L. m. aegu, the Burbot, or Eel-Pout, is the only British
species of this numerous family of fishes that lives per-
manently in fresh water, and prefers in this country slow
running rivers; but it is neither so generally known, nor so
much esteemed or encouraged, as from the goodness of its
flavor it deserves. It is said to be found in various parts of
the north of Europe, Siberia, Asia, and India. In this
country it is rather local. It occurs in the Cam, and in
some of the rivers of Norfolk and Lincolnshire. The
Trent produces it, and Nottingham market is occasionally supplied with samples for sale. The Burbot is not unlike the eel in some of its habits, concealing itself under stones,
waiting and watching for its prey, which consists of aquatic
insects and young fishes, under arches and near eddies, into
which and round which animals are brought and brought
by the current of the water. It feeds principally during the
night, and like the eel, is most frequently caught by trimmers
and night-lines. The Burbot is sometimes called the
Cottager's pet of lurking and hiding itself in holes like a rabbit. It spawns in February and March, and from this,
very tenacious of life, and is said to have lived a considera-
table time in a cold and damp situation, fed on small fishes
and raw meat. In this country it has been known to attain the
weight of 44 lbs, but a common weight is about 3 lbs.

The flesh is firm, white, and of good flavour, and is some-
what considered superior to that of the eel. As the Burbot
is extremely hardy, it might be increased in any quantity,
without the expense of the trouble and cost of the experiment. It would thrive well and multiply in large lakes. The length of the fish is from one
to two feet; the head depressed, smooth; jaws equal; chin
with one barbule; the gape large, with small teeth above and
below near the jaw, the eye just in the middle of the site; gill-opening large; the length of the head as compared to that of the body as one
to four; the form of the body cylindrical, compressed pos-
teriorly; the first dorsal fin is small and rounded, the second
elegant, reaching nearly to the tail; both dorsal fins nearly
uniform, base of the first placed very forward, narrow, and pointed; the pectoral fins large and rounded; the anal fin begins on a line behind the commencement of the second dorsal fin, but ends very nearly on the same
plane; the tail small and slightly pointed; the colour of the
body yellowish-brown, clouded and spotted with darker
brown, and covered with a mucous secretion; the under
parts lighter; the lateral line indistinct and straight; scales
small; the fins parraking of the colour of the part of the
body from which they emanate, these of the lower region
being much the lightest.

(Yarrell, British Fishes.)

LOTUS, a genus of Plants belonging to the natural order
Linguissaeae. It has a calyx with 5 nearly equal teeth;
keel is much shorter than it. The petals are ovate or ob-
vient at their upper margin; longer filaments dilated up-
wards; style knobbed at the base, bilobed, subulate; pol
linear; many-seeded, 3-valved, imperfectly divided by trans-
versal wings.

L. corniculata, Common Bird's-Foot Trefoil, is found
in pastures and on dry banks in Great Britain. The claw
of the standard is obovate, transversely vaulted; calyx-
teeth straight in the hand, subulate from a triangular base,
points of the two upper calyx-teeth rounded; a few of the
third line double, tubercle horizontally placed; flowers
shorter, about 1.5 cm long.

L. angustifolium is found in the south of England, near
the sea. It has the claw of the standard linear; calyx-teeth
straight in the hand, subulate from a triangular base, two
upper ones diverging; heads 8-12-flowered; subulate
ovariable; stamens roundish oval.

L. hybridum is found near the woods in Devonshire and
Cornwall. It has the claw of the standard subulate; calyx-
teeth straight in the hand, subulate; pod rugose, terete, twice
as long as the calyx; beak elongate, sessile, bent downward;
heads few-flowered; leaves obovate-lanceolate; stipules
half cordate; stem procumbent. There are many other
species of this genus, none of which are of any
importance.

LOUGHOR. [Glamorganshire.]

LOUIS PHILIPPE, King of the French, Duc d'Orlans,
and Chartres, and Comte de Neuilly, was the eldest son
of Louis Philippe Joseph, Duc d'Orléans, the Philippe
Edifié of the Convention [Orleans, Hous of], and Louise Marie de
Bourbon, daughter of the Duc de Penthièvre.

Louis Philippe himself was born at Paris, October 26th,
1773, his father, Duc d'Orléans, sickly and feeble, and the
judicious training of Madame de Genlis was well
calculated to draw out the good qualities of those who were
brought up under her charge. In his infancy he bore the
title of Duc de Valois and afterwards of Chartres. In 1831
the young Duc de Chartres, having been elected to the
collegium of the 14th regiment of dragons, assumed the
command of that corps. It is said that almost his first act
of authority was the rescue from the fury of the mob of
some deputies whom the king wished to be brought before
the court, an act of which the king had been expressly
instructed by the government from all ecclesiastics. On
this occasion he showed great tact and presence of mind, and
was subsequently received the honour of a civic crown from
the municipality of Vendôme for rescuing M. de Saint
Brisson. The events of the following year were very
much the same, and from that time he became popular among the French people. In August 1794, the young
Duke quitted Vendôme in command of his regi-
ment for Valenciennes. Whilst he was stationed there, he
was proclaimed against Austria, and in the April follow-

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he entered on his first campaign. He fought his first battle at Valmy on the 30th of September, and on the 6th of November was again engaged under Dumourier at Jemeppe.

At this period the Revolution was rapidly advancing to a crisis, and on the 10th of October (1792) against the Bourbon race; and though his father, the Duc d'Orléans, had renounced his titles and had been enrolled as a citizen under the name of Philip Édouard, his son, Louis Charles de Bourbon, future Louis XVI., was born in Paris, where, having been made the drape of the revolutionary party, and having voted for the death of Louis XVI., he was dragged to the scaffold in his turn, January 21, 1793. For several months after this date the young duke remained at his tutorship under the care of Montpensier, and the Committee of Public Safety summoned before them both the Duc de Chartres, and his faithful friend Dumourier. Aware of the sanguinary character of the tribunal before which they would have to plead, they fled to the Belgian frontiers, and made their escape into the Netherlands, then in possession of Austria. The Austrian authorities gladly received the fugitives, and even offered to bestow on a commission in their army; but he refused to take up arms against his country, and retired into private life. In April he set out disguised as an English traveller, on a tour through Germany, and journeyed through Léige, Aix-la-Chapelle, Cologne, and Koblenz, towards Switzerland. The resources at his command were small, and he was beset by dangers wherever he went. The English authorities restored him to the duchy of Aix-la-Chapelle, at the same time fled the country together with Madame de Genlis, and met her brother at Zurich. The authorities of that canton, in fear of the French government, restored the Duc de Montpensier, and put an end to the secret abode in Zoug; but being discovered, the duke placed his sister and Madame de Genlis in the convent of St. Claire, near Beaumarchais, adopted the disguise of a traveller, and started on a fresh journey of danger and adventure.

His funds were nearly exhausted, and when received from M. de Montesquieu the offer of a post as professor in the college of Reichenau, close by the confluence of the Upper and the Lower Rhine. He at once offered himself for examination, and was distinguished by the celebrated David Chabaud, in October 1793. Here he remained eight months, during which he was engaged in lecturing on mathematics and geography. At this time he accepted the friendly offer of M. de Montesquieu of an asylum at Beaumarchais, where he remained in concealment till the close of 1794. His retreat being again discovered, he next went to Hamburg, in the hope of being able to procure a passage to America; but being disappointed, he crossed over via Copenhagen to Norway, Sweden, and Finland, where he traversed almost empty and desolate regions, for the purpose of making the course of circumstances at Paris had changed, and the Directory became anxious to compromise matters with the Orléans family, by procuring their voluntary removal to America. The Duc de Montpensier and the Comte de Beaujolais, who had been thrown into prison as dangerous subjects, and at the same time in order to procure the restoration of his mother's states which had been confiscated, Louis Philippe (whom we shall henceforth term the Duc d'Orléans) accepted a passage to the United States, and having left the Elbe in September 1796, reached Philadelphia, where he was joined by his two brothers. The next year the three brothers agent travelling through the United States, and on the return of this excursion, the duke gained great repute for his medical skill, by lancing a vein in his arm in an attack of fever. He afterwards performed the same operation for an Indian chief; in reward for which he was allowed to pass the night upon the large rug at the feet of the wild sovereign and his relatives. Having made the acquaintance of Washington at Mount Vernon, they returned to Philadelphia, whence they proceeded to New Orleans, and thence to Havana. Here the Spanish authorities declining any further intercourse with them, the Duke of Kent was induced to go over to New York, and crossing to England in a sailing packet, they landed at Falmouth in February 1800. The royal exiles were welcomed in London by the King, the Prince of Wales, Lord Grenville, the Marquis of Hastings, and the leaders of the politics and fashion of the day. An Orléans mania prevailed through London, and an invasion of France to effect the restoration of the Bourbons was even talked of. After a short time the brothers settled at Twickenham, in a house formerly occupied by General Pollock, and since known as Orleans House. The Duc de Montpensier, whose health had long been declining, died at Twickenham in May 1807, and was buried in Westminster Abbey. Soon afterwards the health of the Duchess of Brabant, sister of the Duc, failed also, and having gone to a warmer climate in obedience to the order of his sovereign, accompanied by the duke his brother, he died at Malta in 1808. Being now rejoined by his sister, who for fifteen years had lived in retirement in Hungary, and by his mother, whom he maintained in a sumptuous palace at Aix-la-Chapelle, the Duc de Montpensier died, at Milan, on the 17th of March, 1808. It was not till 1815 that he gained the affections of the Princess Amelia, the second daughter of the king, to whom he was married November 25, 1809. For upwards of four years the Duc d'Orléans resided at Palermo without taking any part in the public affairs of Europe, if we except a visit which he paid to Spain in 1810, in the illusive idea that negotiations commenced by the Spanish and English authorities might eventuate in an offer on their part to enthrone to his hands the regency of that country.

In 1814 tidings reached Palermo of the downfall of the Bourbons, and of the expected restoration of the Bourbons. The duke returned to Paris without delay, and was re-instated in his honours and military rank. The return of Napoleon in the early part of the following year again troubled the d'Orléans family. The Duc decided to return to England, to procure a dispensation for his life, and to accompany the royal family to England for safety, the duke took the command of the army in the north in obedience to the orders of Louis XVIII. Rather than endanger the peace of France by family feuds, he resigned his command in the following May, and went to Reichenau, where he remained till Paris after the Hundred Days, in obedience to a decree compelling the attendance of princes of the blood in the Chamber of Peers. He conciliated the popular esteem and respect by his kindness to the Orléans family. He returned to Paris, and took part in the political measures. Louis Philippe, in his place in parliament, publicly protested against the extreme measures proposed by the government against those who had taken part in the revolution, and procured their rejection. Louis XVIII, who regarded him with especial favour, in disgust and revenge, forbade princes of the blood royal to appear in the Chamber of Peers. The Duc d'Orléans revived himself upon the court by entering his son in one of the public colleges as a simple citizen of Paris. He returned to England, and continued his correspondence with his family till the days of that king's life, and the first few years of the reign of Charles X. He did not return to France until 1857, when he took up his abode at the palace of Neuy, where he continued to live as the Prince of Orléans until 1880.

In 4th month he was made a marquis of France, and was the first among the French nobility to hail the king. For the two days of July it was agreed by a provisional government, in which Lafayette, Twickenham, Thiers, and other politicians, took the lead. They naturally turned to the Duc d'Orléans, and in the name of the French crown, invited him to assume the Sardine crown. The Duc, however, once having accepted the crown, and having having been accepted on the 25th of July; and, the preliminary forms having been passed through, on the 9th of August the crown was formally accepted by the Duc d'Orléans, who was proclaimed as Louis Philippe. For seventeen years he sat on his elective throne; and an increase of the wealth and physical progress of a nation be a test, the results of his reign may be advantageously compared with those of the first empire. Peace was preserved without war, the arts and commerce increased steadily. His foreign policy was happy and successful: his sons, the Duc de Némours and the Prince de Joinville, carried the French arms into Algeria; Abd-el-Kader was made a prisoner, and the Bey of Constantine submitted and became a French military colony. Yet the king was not popular at home. He was hated alike by the Legitimist party, in whose eyes he was but a usurper, and by the revolutionists, who sighed for entire emancipation from kingly rule. Besides, there are deep and dark slants upon the reign
Heraclea, founded about n.c. 433 by the inhabitants of Thurii and Siris, was the place of meeting of the Italian League of Cities. In 1846, the Congress of Paris transferred the meetings to Thurii. The city early rose to prosperity, and was in close alliance with Tarentum against the Lucanians and Messapians. The first engagement between Pyrrhus and the Romans took place in the plain between Thurii and the Sybaris. Its site is marked by mounds of rubbish and the foundations of ancient buildings near the farm of Policoro, which is marked on some maps near the mouth and on the right bank of the Agri. Many coins, bronzes, and other antiquities have been found on the site, and a short distance west of it are the two very interesting bronze tables called Tablebe Heracleiaca, which contain a Latin inscription relating to the municipal regulations of the city. On the back is a long Greek inscription of earlier date and of much less interest.

The coins of Heraclea are beautiful masterpieces of ancient art. Zeus the painter, it is said, was a native of Heraclea.

LUCAS, FREDERICK, was the second son of Samuel H. Lucas, Esq., of Croham, near Croydon, Surrey, a member of the qualifying list of practitioners in 1842, and was educated at the London University, where he gained early distinction as a debater. He was called to the bar in 1838, and in the following year became a member of the Roman Catholic Church. In his new position he took an active part as a善celar of the faithful, and became the founder of the "Royal Tablet," newspaper, which he conducted as editor for many years. He was also a frequent contributor to the 'Dublin Review.' In 1849 he transferred the 'Tablet' from London to Dublin, and in 1852 was elected M.P. for Evesham.

LOVAGE, HALECRIA, S. 21

LOWESTOFFE, OR LOWESTOFT. [SUFFOLK.]

LOUXOCLASE, A Mineral belonging to the anhydrous silicates of Alumina. It has nearly the form of Felspat, but is in a cleavage parallel with the 14th di- diagonal. It contains 6 per cent. of soda and 3 per cent. of potash. It is found at Hammond, in the state of New York, in company with Pyroxene, Graphite, and Calepsar.

LOYDIA, or LLOYDIA, a genus of Plants belonging to the natural order Liliaceae. The perianth is persistent and patent; stamens inserted at the base of the perianth; anthers erect; style filiform; stigma trigonous; seeds angular above, flat beneath.

LUCANIA, a province of ancient Italy, bounded N. by the Silurus, the Apennines, and the Bradanus, which separate it from Campania, Samnium, and Apulia respectively; E. by the Gulf of Tarantum, along which it extended to the mouth of the Crathis; S. by Bruttium, and W. by the Tyrhenian Sea, between the mouths of the Leus and Silurus. The territory of Lucania is now comprised chiefly in the modern province of Basilicata; portions of it are included in Calabria and Principato Citi. Under these heads the physical geography of the country is given, and many particulars respecting its ancient towns. The rivers that fall into the Gulf of Tarantum from the Silurus and the Crathis were—proceeding from the north, the Cassaneus, the Acadlandus, the Acritos, the Siris, and the Sybaris. These rivers rise in the mountains that cover all the interior of the province, and run generally in the direction of east by south across a very fertile plain, which skirts the shore of the Tarentine Bay. Along this shore were several celebrated cities founded by early Greek colonies; Metapontum, between the mouths of the Bradanus and the Casaneus; Heraclea, near the mouth of the Crathis; and on its right bank; a little higher up the right bank was Paestum, near the mouth of the Siris and on its left bank; Syracus, near the mouth of the Siris; and Thurii, a few miles higher up in the plain between the Crathis and the Sybaris. On the coast of the Tyrrenian Sea, a few miles from the Silurus, and Elae, or Velia, further south, on the Bay of Elae, and a few miles north of the promontory of Palinurus.

LUCIUS, FREDERICK, was the second son of Samuel H. Lucas, Esq., of Croham, near Croydon, Surrey, a member of the qualifying list of practitioners in 1842, and was educated at the London University, where he gained early distinction as a debater. He was called to the bar in 1838, and in the following year became a member of the Roman Catholic Church. In his new position he took an active part as a speaker of the faithful, and became the founder of the "Royal Tablet," newspaper, which he conducted as editor for many years. He was also a frequent contributor to the 'Dublin Review.' In 1849 he transferred the 'Tablet' from London to Dublin, and in 1852 was elected M.P. for Evesham.

LUF, a genus of Plants belonging to the natural order Cucurbitacae. The male flowers are panicled and yellow; the tube of the calyx hemispherical, segments longer than the tube; petals distinct, dropping off by the base; stamens 6, distinct; anthers very small. The female flowers are solitary; the tube of the calyx oblong, clavate, shorter than the tube; stamens abortive; stigma reniform; gourd ovate, 3-celled, fibrous, internally operculate.

L. amara is found in hedges and dry uncultivated places in the East Indies. It has several stems, slender, rooted to a great extent, but with few branches, pretty smooth, 5-angled; tendrils 3-cleft: leaves slightly 5-lobed, rough; stipules axillary, solitary, cordate, with glandular marks on one side. Male flowers pretty large, yellow, on long erect axillary racemes; the petals with a glandular base near the base and articulated a little above it. Female flowers rather larger, axillary, solitary, pedunculated; fruit oblong, 3 or 4 inches long, and 1 inch in diameter, tapering equally towards each end, 10-angled; when ripe dry, gray, and split; seeds with a glandular base near the base, with elevated minute black dots; every part is extremely bitter. The fruit is violently cathartic and emetic; the juice of the roasted young fruit is applied to the temples to cure headache by the natives of India; the ripe seed was used either in infusions or substances by them to purge.
L. Bindiaus is a native of Hindostan. It is a climbing dicotyledonous plant; the leaves are toothed and 6-angled. Male flowers in racemes. Female flowers solitary; fruit round, echinate, with long, straight, ciliate bristles. It is introduced in northern India a powerful drastic in cases of dropy. The leaves of L. aculeatus are a favourite potherb of the natives of India, and are esteemed very wholesome.

**LUG-WORM.** [Annelida, S. 2] LUMINOSITY OF ORGANIC BEINGS. Organic bodies under certain circumstances become luminous, and on the subject there have been made many discoveries, and the combination of phosphorus at a low temperature, the phenomenon has been called phosphorescence. This luminosity is very constantly developed under the same circumstances by animals and plants. It is exhibited both during the decomposition of the bodies of plants and animals, whilst they are still living. The oldest observations on this subject were made on the wood of trees whilst in a state of decay. This however takes place only under peculiar circumstances. It generally occurs when the wood of trees is buried in the earth whilst they are in a green state, and does not take place when wood is allowed to decompose in the usual way and in free contact with the air. It is also found that the phosphorescence does not take place when the wood is lampblack, or when the specimen is not immersed in a liquid. To exhibit this property will retain it for a long period when kept in a dry place. Albrecht observed luminosity in a tree which during the night at a spot where one of its branches had broken, it was emitting light, and this light can be made to emit this light. Travellers in tropical climates have observed that when plants containing a milky juice are wounded, the juice frequently becomes luminous, whilst it is descending the sides of the tree. The cause of this phenomenon in fresh water is the same as in the wood of trees, the tissues attended with a union of oxygen gas, but what determines the development of light under these circumstances is still unknown.

In living plants luminosity has been frequently observed. It is frequently observed on the leaves of algae, mosses, and other plants; especially of fungi, especially of the genus Rhizomorphus. In the coal-mines in the vicinity of Dresden the species of Rhizomorphus are so numerous as to "dazzle the eye by the brilliant light they afford." [Brauner, S. 1.] The light from decaying wood, as also from the living Rhizomorphus, continues although they are immersed in an extinguishing gas, linseed oil, phosphoric acid gas, oxygen, &c. The phenomenon in both the living and the dead plants is probably due to the same cause.

Another phenomenon also observed is the light emitted by the Mosses. Several species of the genus Schistothecia, which grow in caverns and other damp places, have been observed to give out light. Mr. Babington and other botanists have observed in the dark the virtues of fungi by fire, Funk, Brandenburg, near Essen, Hennock, Hornschuch, Strohe, Unger, Bridel-Briderei, and Agardh, have observed it on the continent of Europe. The two latter attributed this light to a small alge, which Bridel-Briderei called Cupeliopsis emaragdina, and Agardh called Protococcus emaragdinus, which they supposed was parasitic on the moss. Unger however has examined the moss closely, and finds that at certain seasons the tissues of this moss assume a globular form, and being partly transparent, the light is refracted in a way as to present a luminosity on the surface of the vessels.

Another class of these phenomena is that which is exhibited by the flowers of some plants. The first observation was made by Mr. Meissl, the daughter Christina Linne. She was walking in the garden one hot summer's evening, when she observed the flowers of Tropaeolum majus to give forth a stream of light. This was attributed by many to an optical illusion, but the fact has since been repeatedly observed and is often, if not always, observed as other plants. We are not perhaps in a position to say this was not an optical illusion; but if it was, one would expect that it should be more constant. It has also been seen by several observers in different positions, and when one has seen it, the others have seen it also.
from their invariably elevated limits. During this growth the glandular layers the epidermal epithelium extends itself by spontaneous multiplication of its cells (division), while at the same time the fibrous layer surrounding them also grows, and finally constitutes the fibrous membrane of the bronchus and air-cells, together with the vessels and nerves. In the second month from the beginning the large bronchial leaves are already formed; and besides them smaller divisions also, 0.16" in size, may be recognised, originating in the dilated extremities of the bronchus, which even at this time are considerably ramified. As development proceeds, and the resolution of the divisions, these gray granules, as they are termed, become more and more numerous, and ultimately, in the fifth month, are aggregated so as to form smaller lobules of 0.16"-0.48" in size, each of which is considered to be produced from a single glandular or bronchial termination, of the second month. Each of the gray-granules of these lobules, which correspond with the secondary lobules of the future lung, by continued budding, finally constitutes a primary lobule, which, with air-cells of 0.06"-0.08" in size, first becomes distinctly visible in the sixth month, although up to the time of birth new alveoli are constantly superadded. In the newborn child the secondary lobules measure 2"-3"-4"; the alveoli, before they are filled with air, are 0.06"-0.04", and the alveoli of the latter at this time appear to exist in the same number as in the adult, the further increase of the lungs proceeding only from the expansion of all its parts.

The history of the lungs," continues the translator of Kölliker, "presents us real difficulty, except in one point; that is, with respect to the relation of the pulmonary cells to the terminations of the bronchus; but here the difficulties are very considerable. In recent preparations it is obvious that the air-cells communicate in many ways, and in any case that they are not merely terminal on the extremities of the bronchus. If it be desired to investigate the whole subject, inflated and dried lungs (it is better in this case to prepare in an air-pump dry they by itself, or with transparent preparations, or lungs injected with uncoloured substances (wax and resin), are most suitable; and with such a definite result will be obtained, after a series of observations. Before the injection of the bronchus is proceeded with air must be exhausted in the air-pump, for which purpose also, though less conveniently, a well-fitting syringe may be employed. The injection of the blood-vessels is readily effected, and the preparation should be kept wet; sometimes when injected with opaque material, such as lead, the processes of air-collection of the bronchus with transparent substances (Prussian blue, &c), dried preparations are to be preferred. The air-cells and bronchus, the larynx and trachea, are readily examined. The epithelium is procured in thin plates in the section through the lung, as well as ciliated cells. If it be wished to study the alveoli, the air must previously be carefully removed. These are best displayed in man, in whom also all other parts, such as cartilage, elastic elements, muscles, and glands, are easily obtainable."

(Kölliker, Manual of Human Histology, translated for the Sydenham Society by Busk and Huxley.)

LYCOPODIUM. (Botany, S. 2.) LYCIUM, a genus of Plants belonging to the natural order Solanacea. It has an uncoated calyx regularly 5-toothed, or irregularly 3-5-toothed; permanent corolla funnel-shaped or tubular; limb 6 or 10-toothed, or toothed, imbricate in attachment, sometimes plicate; stamens 6, usually exerted; filaments banded and widened at the base; stigma pellitally depressed, or capititate, biculate; berry roundish, 3-valved, propped by the permanent calyx; placenta adnate; seeds numerous, reniform. The species are trees or shrubs usually spinose. Corollas white, yellow, rose-coloured, purple, blue, or scarlet.

L. europaeum has erect loose branches; buds spine"ented; leaves fascicled, ovate, lanceolate, obtuse, or spathulate, bent obliquely; flowers twin or solitary; corolla funnel-shaped, back banded, but short, lobed, 8. It is a native of the south of Europe and the north of Africa: in the Greek islands common in hedges, but scarcely indigenous. The calyx is 8-toothed, ruptured at the side: the orange-pot is large and articulated with red veins; tribe gree

L. barbarum has dependent branches; buds spiny; leaf lanceolate, flat, glabrous, acute; flowers twin, extra-calycal, petals back banded, but short; stamens 8. It is a native of the north of Asia, Africa, and south of Europe. There is a variety having pale corollas and yellowish red berries.

There are about 30 species of this genus described, many of which are of medicinal and pharmaceutical use. They are commonly known by the names of Fox-Thorn.

LYCOPODIUM, a genus of Plants belonging to the natural order Lycopodineae. It has 1-celled 2-valved capsules, containing powders, or 4-valved, containing 1 to 4 granules, with the tip of the capsule incurved, with a filamentous point; spines stalked 2 or 3 together, cylindrical; scales ovalate, triangular, membranous, finely incised, serrated. The stem is prostrate and long; branches short and ascending; spines on long stalks, pale-yellow; scales on the stalks irregularly disposed in which the powder contained in the spore-cases is highly infectious: shaken out and collected it is employed under the name of Lycopode, or Vegetable Brimstone, on the Continent, in the manufacture of fire-works and in pharmacy as a uphill, which when coated may be put in water without being moistened. The plant has long been used as an emetic; a decoction of it is said to be serviceable in removing Feces from the bowels.

L. annotinum has scattered lanceolate leaves; spikes sessile, solitary, terminal; scales roundish, with an alternated point, membranes, and jagged. The branches are rather long and erect, each year's growth is marked by a spot when viewed from under. The leaflets are cylindrical, greenish, yellow, not persistent. It is found on stony mountains in the South of France and in Pyrenees, and is common in the Highlands of Scotland.

L. adpermum, Stev. Leaved Club-Moss, has leaves in tufts, imbricated, acute, keeled, entire; spikes sessile; utile, terminal; scales ovate-lanceolate, flat; branches erect. L. dalmaticum, has leaves peltately expanded, the leaflets are rather thicker than the branch. It is found on elevated mountains in Great Britain.

L. salango, Pit Club-Moss, has leaves in eight rows, curved, uniform, linear-lanceolate, acuminate; capsules not spined, but in the axils of the common leaves; stem erect, forked, level-topped. The stem is short, erect, or slightly decumbent, densely leafy. Occasionally in sheltered positions the stem becomes elongated. In the Highlands of Scotland it is made into an irritating ointment, which is applied in cases of eczema and eczematous conster instant. Internally administered it acts as an emetic and cathartic. Linnæus says the Swedes find the decoction serviceable as a digestive lotion, and in destroying the vomiting it is of great value.

L. inundatum and L. selaginoides are the other British species, both common in boggy places. The most remarkable species is the L. rubrum of Chamisso, Yatun corrado, Great Devil. Sir William Hooker, who calls it L. catesbae, states that it acts most violently as a purgative, and has been administered successfully in Spanish America in cases of elephantiasis. According to Vastring, Club-Mosses are likely to become of importance in dyeing: he asserts that the woolen cloths boiled with Lycopodiums, especially with L. catesbae, acquire the property of becoming blue when passed through a bath of Brazil-Wood. L. pelligraphis is reputed an aphrodisiac. L. aquaturn is remarkable for its hygrometrical properties, rolling up into a ball when dry, and expanding when moisture is supplied.

(Dalouf, Classbook of Botany: Babington, Manual of British Botany: Lindley, Vegetable Kingdom.)

LYCOPISS, a genus of Plants belonging to the natural order Boraginaceae and the tribe Anchusae, which have the achene of the contraceptive, an excavated spore surrounded by a tufted ring at their base.

Lycopsis has the calyx in 6 deep segments; the tube of the corolla curved; the limb oblong. The species closely resemble Lycopus, but the limb is rather broader, and the tube rather shorter. L. arvensis, the Bugloss, has lanceolate crass-ductae very hirsute leaves; the calyx of the fruit is bell-shaped, erect. The flowers are small and blue. The whole plant is very hirsut, with strong hairs, each rising from a scaly base; it is common in the fields and hedges of Great Britain and Europe.
LYCOPUS, a genus of Plants belonging to the natural order Lobelias. It has a 4-fid corolla, scarcely longer than the equal 6-toothed calyx; stamens 2; anther-cells parallel or ultimately divergent; 2 upper stamens wanting, or rudimentary, or rarely perfect.

2. *Eurosperma* inhabits wet ditches and sides of ponds, and is known popularly under the name of Gipsy-Wort, because gipsies are said to stain their skins with its juice. It has stalked ova-loblong leaves, glabrous or pubescent, opposite. Flowers small, in dense whorls. It is found on banks of streams and ditches in Great Britain, LYDD. [Kavv.]

**M**

MAAS, or MAES, NICOLAS, a celebrated Dutch painter, was born at Dort in 1625. He was a scholar of Rembrandt, whose manner he imitated with so much skill that it was thought difficult to distinguish the works of the pupil from those of the master. But a visit to Antwerp, where he diligently studied the productions of Rubens and Jordaeus, led Maes, to adopt a new and more independent style; and one in which, while retaining his former neatness and delicacy of touch, and breadth of chiaroscuro, there was more freedom of handling and variety of colour. Maes was an ear in the history of his art, and produced subjects of great pictures, chiefly domestic interiors, but he eventually devoted himself to portrait painting, especially after his removal to Amsterdam, where he settled in 1676; and where he rose into high reputation as a portrait painter, and acquired a considerable fortune by the practice of that lucrative branch of art. He died at Amsterdam in 1693.

British mentions several plates etched by him. In the National Gallery there are three paintings by him—like most of his genre pictures, of small size, but elaborately finished—The Cradle, The Dutch Husbandman, and The Idle Servant.

MACDIARMID, JOHN, was born about 1780 in Edinburgh, where he received his early education, partly at the common schools and partly at the university. He was apprenticed to Mr. Calder, publisher, whence he was removed to the Commercial Bank, where for a few years he was discharged highly responsible duties. While so engaged he ceased not to pay attention to his literary studies, was occasionally amanuensis to Professor Playfair, contributed poetry to the Scots Magazine, and was an active member of a debating society called the 'Forum.' In January 1817 he became editor of the Dumfries Courier, of which he afterwards became the proprietor. It was in this position that MacDiarmid first introduced the character of the provincial press by introducing originality and taste into the conduct of it, his newspaper becoming highly successful, and a model for others. Mr. MacDiarmid had a partiality for natural history, and was always desirous of the acquisition of the animal specimens which occurred; but though a laug was sometimes raised at his accounts of enormous gooseberries or marvellous turnips, it is not known that he ever willingly exaggerated. In addition to this, he drew attention to the antiquities and natural beauties of Dumfrieshire, and the adjacent counties of Kircudbright and Wigtown, not only in the newspaper, but by separate publications, 'The History of Dumfries,' the 'Guide to Moffat,' etc. His other works were— a 'Life of Cowper,' published in 1817; a 'Life of William Nicholson, the Halloway Post'; 'Sketches of Nature,' 'The Scrap-Book,' etc. After conducting the paper with extraordinary vigour and fertility, he died on November 12, 1829.

SMITH, VICTOR, who distinguished Scotch naturalist. He was born in the Isle of Harris, and early acquired a taste for natural history, and having gone to reside in Edinburgh, became the assistant of Professor Jamieson in the Natural History and Geological Museum of the University. He was afterwards appointed to the position of Con

The following estimate of his character appeared in a notice of his 'British Birds' in the 'Atheneum' for 1829:—

"Dr. Macgillivray was a naturalist, and one of no mean order. Had he confined his attention to a few of the subjects of the vast field over which he laboured with unwearied industry through a long life, he would perhaps have attained a yet higher position as a man of science than that which he has already reached. With a constant, unvarying, and unerring eye on the sea-above, he had an eye to every natural object that surrounded him, and the interest with which he regarded them is expressed in the numerous papers and works which he has
written on botany, zoology, and zoology. Though a list of Dr. Macgillivray's works would alone occupy a large space, yet he was not a man of the closet. Though one of the most diligent of compilers, he was a laborious original investigator. Whilst he lived by natural history as a profession, he pur¬

sued it as a science, and in return for the scanty means which it impeded to the formation of his closet, and the want of existence, he rendered a large amount of observation made with great labour and self-sacrifice. Although naturally an amiable man, he has frequently in his works—as is often the case with men of an ardent character, to himself strongly on the views of others, and in this way he made many enemies during his life. Now that the grave has closed over him, these with whom he most differed will be the first to admit of his career only to admire.

MACHZERIUS. A genus of plants belonging to the natural order Lepidinae. One species, M. Schomburgkii, produces the Iaka Wood of Guiana, remarkable for its brown and black streaks, on which account it is employed in hairnet-work.

MACYLLLETH. [Montgomeryshire.] MACLURA, a genus of Plants belonging to the natural order Rosaceae. The fruit of M. aurantiaca, the Osage Orange, is as large as the fist, orange-coloured, and filled with a dry, white, native taste. It smears their faces when going to war. The wood of M. nitidioria is the dye-wood called Fustic; it contains Morine, a peculiar colouring substance; its fruit is pleasant; and used in American medicine for the same purposes as the black mulberry. According to Martius, both the other species of the genus yield succulents in Brazil. (Lindley, Vegetable Kingdom.)

MACROCYSTIS, a genus of plants belonging to the natural order Liliaceae, and the tribe Laminartdei. The enormous fronds produced by M. pyrifera have been spoken of by many navigators. They appear to be from 600 to 1800 feet in length; the leaves are long and narrow, and at the top which is in each a vessel filled with air, without which it would be impossible for the plant to support its enormous length in the water, the stem not being thicker than the finger, and the upper branches as slender as common pack¬

thread. This plant was seen by Dr. Joseph Hooker in 61° 8' lat., where he was vegetating patches wherever the water was free of ice-bergs.

MACRÖDIPTERYX. [Night-Jar.] MACRÖGLOSSA. [Chefroptra.] MACROOM, county of Cork, Ireland, a post and market¬


town, and the seat of a Poor-Law Union, is situated on the river Sallane, and on the road from Cork to Killarney, in 61° 56' N. lat., 8° 56' W. long., distant by road 244 miles W. from Cork, and 163 miles S.W. by S. from Dublin. The population is 3747, in 619 houses, in the workhouse of Macroom Poor-Law Union comprises 25 electoral divisions, with an area of 179,106 acres, and a population in 1851 of 37,394. The town consists principally of one street nearly a mile in length, occupied in great part by cabins and other mean dwellings, and the central part of the town is served by shops. The parish church, the Roman Catholic chapel, the sessions-house and bridewell, and a market-house, the dispensary, and the Union workhouse are the public edifices. Petty-sessions are held monthly. Fairs are held on the 12th day of May, July, September, and November. There is a large weekly market. Macroom Castle is a fine old structure overhanging the river.

MACROPERIP, a genus of Plants belonging to the natural order orchidaceae, the Arum is the most celebrated of the narcotic Pepper-Worts. It has corotate acuminate many-nerved leaves; solitary axillary spikes, very short, pedunculated, and spreading. The rhizome is thick, woody, rugged, and aromatic. It is used in tincture against chronic rheumatism. Macerated in water it forms an intoxicating beverage, of which the Othetians make use as a medicine; they make themselves drunk, after which very copious perspiration comes out; this lasts three days, at the end of which the patient is cured.

MACHRONIUS. [Salam.] MADATEUS. [Chemoptera.] MADELEY. [Shropshire.] MAELSON. [Lancashire.] MAES. [Mae. S. X.] MAGENDE, FRANCOIS, a distinguished French physician and physiologist. Although his father practised as a physician in Paris, he was born at Bordeaux on the 15th of October 1783. He was soon after brought to Paris, where he had the misfortune to lose his mother. His father took an active part in the revolutionary movements of the period, was mayor of the 10th arrondissement, a member of the Hospital Council, and of the Comune of Paris. He also served in the National Guard. After the execution of his pupil, and afterwards his demonstrator of anatomy. At the age of twenty, after an examination by concours, he was appointed aide d'anatomie (prosector) in the Faculty of Medicine, and afterwards, the raterwards, became a deliverer enthusiastically to the study of surgery, but he was induced by Dupuytren to give up this branch of the medical art, and devote himself to the practice of medicine. He was subsequently appointed physician to the Hotel Dieu. In 1819 he was elected a member of the Academy of Sciences; he was also a member of the Academy of Medicine, and in 1831 he succeeded Professor Recamier, who had resigned on the accession of Louis Philippe to the three of France, in the chair of anatomy in the College of France. He was in charge of the medical clinic of the University of Paris, which used as one of the most illustrious physiological experimentalists and discoverers. His larger works are as follows:—1. "Fon¬

bles pour la Preparacique et Emplie de plusieurs nouveaux elements" (1826). This work was originally speedily translated into all the languages of Europe. It contained an account of the action of those potent active principles found in plants, which had at that time been introduced into the practice of medicine, more particularly by the work of Guyton de Morveau. It included such remedies as morphia, strychnia, prussic acid, and others, on the operation of which the animal system Magendie had successfully experimented. 2. "Prin¬

elementaire de physiologic." This work was originally published in French and English, and for many years it was one of the best known and most useful books for the student of physiology. It was translated into French and German, and is known as "Les Phénoménas physiques de la Vie." These were a series of lectures delivered at different times, and collected together by M. J. James, and published in 1834-41. These were also translated, though occupying four volumes in German. 4. "Lecons sur les Fonctions et les Maladies du Systeme nerveux." These also were lectures delivered at the College of France, and were published in two volumes in 1839, 5. "Lecons sur le Sang." These lectures on the blood were published in 1842, and afterwards translated into French, Italian, and other languages, and are known as "Les Phé¬

noména physiologiques et cliniques sur le liquide cephalo-rachidien, or cerebro-splanical," Paris, 1842. In addition to these large works, Magendie published a large number of papers, which will be found scattered through the "Comptes rendus" for the years 1826-41. He wrote several philosophical and medical experiments, a periodical which he started in 1821, and which he continued to edit for ten years. He was also a contributor to several of the Dictionaries which appeared in France during the commencement of the present century. He was the author of the "Dictionnaire de Medecine," the "Chirurgie pratique," the "Encyclopédie des Graus du Monde," and the "Dictionnaire de Medicine usuelle." Although Magendie wanted the generalising power which was possessed by his friend at the head of European physiology, he was most industrious in the progress, and ingenuity in devising of physiological experiments. It was as an experimenter that he produced a lasting impression on the progress of physiology. In fact so numerous were his expe¬

iments at one time, and the result of these in the physiological societies of France, that he thought it necessary to interfere. Some of the results of his physiological enquiries are too important to be passed over in this notice:—

1. He successfully demonstrated what had been only suspected by previous physiologicalists, that the veins were organs of absorption. His experiments on this subject have been regarded by physiologicalists as setting this question at rest, and proving that the veins are the great agents in the absorption of nutritive matters.

2. His numerous experiments on the absorption of poisons led to a more accurate apprehension of the nature of their action on the human system. He first demonstrated that
axyria acts upon the spinal cord, and destroys by paralysis the nerves of respiration, thus inducing asphyxia.

4. He investigated with great care the action of hydrocyanic or prussic acid on the human system, and drew attention to its value as a remedy in certain forms of cough arising from irritation in the lungs.

5. Long before the chemical nature of food was understood, Magendie pointed out that non-nitrogenous foods were innutritious, and that the brain was a mass of muscular tissue, and showed how little it depended on the action of the stomach itself.

6. He performed a series of experiments on the admission of air into the veins, and showed bow likely this was to be a source of death in operations about the thoracic cavity.

7. In a letter to Bell the honour of having discovered the real functions of the spinal nerves. Walker had demonstrated the existence of two roots to the spinal nerves. Bell showed that the nerves performed two functions, that of sensation and volition, and that these were sometimes separate, but the final demonstration of the two roots of the spinal nerves being devoted to the two separate functions, seems to have been first clearly established by Magendie.

8. These more important discoveries and investigations must be added a large number of experimental researches upon the functions of the brain, its parts and nerves. If these did not lead to immediate and decisive results, they have opened many new facts by means of which others have since been guided to more satisfactory conclusions.

Magendie was made a Commander of the Legion of Honour, and few men gained more of the respect and confidence of the government in matters of public health, whilst amongst the medical profession he was the subject of a long series of eulogies, written by his account of his great talent and original genius. He died on the 8th of October 1855.

MAGHERAFELT. [Londonderry.]

MAGONIA, a genus of plants belonging to the natural order of Rhamnaceae. The male flowers have 5-parted nectarial reflexed calyx; petals 6, linear, and unequal; disc unequal between the petals and stamens, on one side long and double, in the other short, simple, and rugose; stamens 6, dissilicate. Hermaphroditic flowers as in the male, but stamens much smaller and not diclinous; ovary 3-celled, many-seeded; styles curved; stigma 3-lobed; capsule large, woody, 3-valved, loculicidal; seeds large, flattened, surrounded with a wing; hilum in the edge of the wing.

M. pseudomesium. a small tree common in the western deserts of North America. In the few books of Miers on the flora of the islands of the Gulf of California, it has downy branches; leaves 6, ovate or oblong, sessile, deeply emarginated and downy; the flowers in a terminal sessile or stalked panicle from 9 to 16 inches long; calyx downy, yellowish-green; petals linear, obtuse above, in the middle smooth and dark purple, at the edges and point downy and green; fruit a large, woody, globe, 3-cornered, somewhat depressed capsule, with 3 valves, 3 cells, and many seeds. The ashes of this plant are extremely alkaline. The bark is used for soothing the swellings produced in the skin of horses by the stings of insects. The leaves of this species and M. gibrosa are poisonous to fishes.

MAPIE-MOTH. [Abrasia.]

MAI, ANGELO, CARDINAL, and Prefect of the Vatican Library, was born at Milan, a member of the old family of the Barberis, who for several centuries held the dignities of the See of Bergamo, Italy, March 7, 1792. He received his early education in the village school, and his first master in the higher studies was the Jesuit Father, Lewis Monzi do Capistiano. In 1799 Monzi, struck by the taste and capacity for classical learning which Mai displayed, selected him, along with four other youths of the village, to enter the novitiate of the Jesuit society, which, although elsewhere suppressed, the Duke of Parma, with the sanction of the Pope, restored in 1796, with consent of the Pope and a majority of his duchy. In this community Mai resided till the provisional restoration of the society in Naples (1804), whither he was sent as Professor of Greek and Latin Literature. About the end of 1805, he was transferred to Rome for the same subject. In 1810 the lower parts of the Papal States were removed to Orvieto, on the invitation of the bishop, Giambarischi. He was then admitted to priest's orders; and to the opportunities which he thus enjoyed of intercourse with two learned Spanish fathers of the Jesuit order, he was enabled to acquire a knowledge not only his familiarity with the Hebrew language, but what much more sensitively influenced his after-career, his accurate knowledge of palaeography, and his skill in deciphering.

Mai returned to Rome in 1806, just about the time when the contest of Pius VII. with Napoleon was reaching the crisis; and an order issued by the vicar-general, commanding all subjects of the kingdom of Italy to return to their respective provinces, compelled him to change his residence once again. Happily for the interests of literature he settled at Milan.

The Ambrosian Library of that city had long been known rich in manuscripts of the highest interest—the remnant of the treasures which after the fall of the republics had been collected by the Medici, the Este, the Farnese, and those of Bobbio and Lucca, and of some of the suppressed Benedictine convents of the Protestant cantons of Switzerland. Many of its best treasures had been made public by Muratori, Mahillon, and the Benedictine editors; but there it yet remained a department entirely unexplored, which Mai soon appropriated to himself, and which has since come to be regarded as exclusively his own—that of palimpsest or re-written manuscripts, in which the original writing has been effaced or effaced by other writing put over it. Through the influence of Padre Monzini and the recommendation of his friends, and especially of Count Mellerio of Milan, Mai was admitted an associate and, eventually a member, of the Accademia, and, from the date of his arrival in Milan till his ultimate removal to the Vatican, he laboured in his novel editorial career with a zeal and success not unworthy of the traditional glories of his country. His first essay as an author was a Latin translation (with a sombreant of Lacordaire's 'De Republicationes') (1813), the original of which had been published by a Greek named Andrew Mustoxidi in the previous year; but this was only the prelude of his far more remarkable successes in the decipherment and publication of palimpsest manuscripts.

Mai further dedicated to this inquiry Knittel's 'Codex Ephraemi,' Wetstein's readings of the Old and New Testament from the 'Codex Vysobradus,' Klinel's portions of the Gothic Bible of Ulpian, Peter Brunn's fragment of the unity-first book of Livy, and Barrett's palimpsest of the Gospels, palimpsest literature was entirely untried. Within a few years Mai deciphered and published from palimpsest sources two volumes of illuminated fragments of Cicerio's 'Orations,' a volume of letters and other writings of Fronto, the preceptor of Marcus Aurelius, three portions of Plutarch's 'Romana' of Plantus; a lost work of Porphyrius, the Platonic; some portions of Dionysius of Halicarnassus; two works of Philo Judæus; eight orations of Lysimachus; an oration of Isaeus; several manuscripts of Virgil's 'Aeneid'; and several other works of the same character.

During this time Mai, although a member of the Jesuit Society, had not taken the solemn vows of the order, which indeed he could not be formally restored by papal authority till 1814. It was then thought, both by his superiors and by the authorities at Rome, that he could render more effective services to literature and to religion by remaining attached to the Ambrosian Library. Accordingly, with the full approval of all the authorities, he withdrew from the Society, and re-entered, as a simple priest, at Milan till 1819, when he was called to Rome as chief keeper of the Vatican Library, canon of the Church of St. Peter's, and domestic prelate of the Pope Pius VII. Soon after his establishment in the library of the Vatican, he was sent to France to visit the palimpsest of Fronto which he had already prised at Milan; having happily discovered in the Vatican the missing portion of the manuscript from which the Milenaue fragments had been prised, and which (as well as the Milanese manuscript) originally belonged to the library at Bobbio. In the following year he published the work by which he is best known out of Italy—a large and interesting portion of the long-lost 'De Republica' of Cicero, the fragments of which he arranged in a continuous narrative, and added with considerable ingenuity, and with all the known extracts of the work which had been preserved from ancient authors. The whole text he illustrated by a critical commentary of exceeding interest, which at once established his reputation as one of the first scholars of the time.
ship. Selecting from the vast and till then imperfectly explored manuscript treasures of the Vatican, he prepared his 'Scriptores veterum Collectio et Vaticanici BibliothecaeDescriptions et Index', published between 1835 and 1844. In the course of this work, he discovered many true authors, by collecting fragments of the same work and dovetailing them together into intelligible order, in selecting from a heap of unknown materials all that is unpublished, and deciding upon the question of its genuineness or its intrinsic value; in a word, in all the thousand investigations which fall to the lot of a critical editor treading on untrod ground, he possessed a skill and acuteness which can hardly have been equalled by any other master of the art. He was accustomed to account for the vast variety of subjects which engaged him, must be regarded as little short of marvellous.

The private character of Cardinal Mai has been well described as the very ideal of a Christian scholar. Eminently popular, his work was developed in a spirit of Greek and Latin, sacred and profane, theological, historical, patriarchal, and philosophical. One of the volumes, the second, is perhaps the most curious of the entire, containing consider- able fragments, recovered from a very early palimpsest manuscript, and giving a key to the works of the ancients historians, Polybius, Diodorus Siculus, Dionysius of Hali-
carnassius, Dion Cassius, Appian, Daphnes, Eusapia, and others.

The 'Vaticana Collectio' was quickly followed by a similar collection in ten volumes, svo. 'Classici Scriptores ex Codicibus Vaticanis editi,' completed in 1838 which included some of the editor's earlier publications (especially the 'De Republica'); although, with the exception of about two volumes, its contents are entirely new. While he was engaged in the publication of this series he held the laborious and responsible post of secretary of the Propaganda, to which he had been appointed in 1833; and it was observed with wonder that his extensive literary engagements never weighed upon his work with the diligence and sagacity of his active and business-like habits, the promptness of his decisions, and the prudence and discretion of his whole administration, are still gratefully remembered by the members of the various missions under the surveillance of the Propaganda.

After five years of service in this laborious office, he was named (1835) cardinal, at the same time with his friend and successor in the Vatican Library, Mezzofanti; and soon afterwards was appointed to several important and confidential offices in the Roman court, chiefly of a literary character. He was named successively Prefect of the Congregation for the Supervision of the Oriental Press; Prefect of the Congregation of the Index; and Prefect of the Congregation of the Propaganda. In in his work in this last department, he has contributed to the still more congenial post of Librarian of the Vatican Church.

This elevation did not interrupt in the slightest degree the literary labours in which he had been engaged. Scurcey was the collection of 'Classici Autorum' completed when he commenced a similar one, also in ten volumes, svo. 'Spicilegium Romanum' (1835-44), equally interesting and valuable in its contents, and a fourth collection entitled, 'Novae Patrum Bibliothecae,' published in 1835 in six volumes 4to., and containing more than 1000 volumes, of Muratori, and indeed far more extraordinary than the others, collections, from the circumstance that it was compiled from the mere gleanings which had escaped the research of the earlier critics and collectors. Several years before, he had undertaken to edit the 'Liber canum' of the Old and New Testament with various readings and prolegomena. The text of this edition was printed many years before his death, but its publication was delayed in order that it might be accompanied by the intended prolego-
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Cardinal Mai's abilities as an editor were of the very highest order, while his collections comprise an infinite variety of authors of every age, of every country, of every language. All the types of the literary departments, Latin and Greek, he appears equally the master. Whether the subject be theology or history, or law, or languages, or general literature, his learning is never at fault, and his critical sagacity never fails. He is the master of the minute and difficult questions which so often arise in connexion with ancient literature, and he is the true author, in collecting fragments of the same work and dovetailing them together into intelligible order, in selecting from a heap of unknown materials all that is unpublished, and deciding upon the question of its genuineness or its intrinsic value; in a word, in all the thousand investigations

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M A L

varieties dull. Hardness, 3.5 to 4. Specific Gravity, 4.

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Dissolves with effervescence in nitric acid. Decomposes and blackens before the blow-pipe, and becomes partly a black scoria. With borax it fuses to a deep green globule, and ultimately a black crust of copper, the surface of which is glistening, or highly polished, being at times partly covered with crystals of copper. The solutions are of a brownish-green color. Green Malachite usually accompanies other ores of copper, and forms incrustations, which when thick have the colours blended, and extremely delicate in their shades and blending. Perfect crystals are quite rare. The mines of Siberia, at Nischne Tagil, has afforded great quantities of this ore. A mass partly disclosed measured at top 9 feet by 18 feet; and the portion uncovered contained at least half a million pounds of pure Malachite. Other rich Cherty localities are in Shetland, in the Tyrol, Cornwall, Australia, and the island of Cuba. This mineral receives a high polish, and is used for inlaid work, and also ear-rings, snuff-boxes, and various ornamental articles. It is not much prized in Jewellery. The larger masses are usually smeltingly reduced in Russia, which are worked into slabs for tables, mantel-pieces, and vases, which are of exquisite beauty, owing to the delicate shadings and reactions of colour. In the Great Exhibition of 1851 there were magnificent specimens of this material in the shape of vases and vases sent thither by the Emperor of Russia. At Versailles there is a room furnished entirely with tables, chairs, &c., wrought in Malachite, and the same to be found in other European palaces. At Nischne Tagil, a block of Malachite was obtained weighing 40 tons. Malachite is sometimes passed off in jewellery as turquoise, though easily distinguished by its shade of colour and much inferior hardness. It is a valuable ore when abundant, but it is seldom smelted alone, because the metal is liable to escape with the liberated volatile ingredient, carbonic acid.

MALACHIUM, a genus of Plants belonging to the natural order Ceratophylidae. It has 5 sepal; 5 biform or entire petals; 10 stamens and 5 styles; the capsules opening with 5 biform valves.

M. aquaticum, Water Chickweed, has a decumbent stem, angular, ascending, and covered with glandular hairs; cordate-obovate leaves, acuminate, seersle, the lowest one stalked; flowers scattered, solitary, perigynous, bipartite, and rather exceeding the calyx; capsule exceeding the calyx. It is usually found in wet places in Great Britain.

MALICIOUS INJURIES TO PROPERTY. [LAW, CRIMINAL, &c.]

MALLARD. [Ducks.]

MALLOW, Marsh. [Malva.]

MALTHACITE. [Mineralogy, S. I.]

M A N.

In classifying the races of men, it must be remembered that the division and subdivisions which are employed do not resemble those which are used in the systematic classification of plants and animals. When the whole of the species of the vegetable or the animal kingdom have to be arranged, then we divide them into various primary and secondary groups, which are called Classes, Families, or Orders, Genera, Species, and Varieties.

Now Man himself is but a species; he belongs to a subordinate group of a large division of the animal kingdom. Zoologically considered, Man is an animal belonging to the class Vertebrata, in the order Mammalia, the sub-order Hominoidea, the genus Homo, and species sapiens. The characters of this species as given by Blumenbach have been stated elsewhere. [Man.]

The same is the arrangement of the races of men, with the definitions given by Dr. Pickering, an American traveller and writer, in his work 'On the Races of Men':—

a. White.

1. Arabian. — The nose prominent, the lips thin, the beard abundant, and the hair straight or flowing.

2. Abyssinian. — The complexion hardly becoming florid, the nose prominent, and the hair curled.

b. Brown.

3. Mongolian. — Beardless, with the hair perfectly straight and very long.

4. Hottentot. — Negro features, and close woolly hair; and the stature diminutive.

5. Malay. — Features not prominent in the profile, the complexion darker than in the preceding races, and the hair straight or flowing.


6. Papuan. — Features not prominent in profile, the beard abundant, the skin harsh to the touch, and the hair curled or frizzled.

7. Negroid, apparently beardless, the stature diminutive, the features approaching those of the negro, and the hair woolly.

8. Indian, or Telingan. — The features approaching those of the Arabians, and the hair, in like manner, straight or flowing.

9. Ediopian. — The complexion and features intermediate between the Telingan and Negro, and the hair curled.

10. Australian. — Negro features, but combined with straight or flowing hair.

11. Negro. — Close woolly hair, the nose much flattened, and the lips very thick.

The most recent writer and greatest authority on the races of man is Dr. R. G. Latham, who, in his work on the 'Minor Varieties of the Human Race,' proposes the following arrangement. He has admitted in the first place, like Cuvier and other previous writers, he adopts but three primary varieties of the human species:—


The termination in 'ide' employed here seems preferable to the use of terms such as class, order, family, tribe, or other words which have another use, either in this or other systems of classification. The terms Mongolida, Atlantida, and Japetida are not derived from a community of meaning in the things they express. Thus, the first includes a nation, the Mongols, who occupied a portion of eastern Asia, and were at one time the conquerors of the world, and are regarded as typical of a large portion of the human race. The Atlantidae are entirely rarely found in Africa; the Japetidae include the races of men in Europe, who are traditionally descended from Japheth; hence the name selected to express them.

1. Mongolida. — The people comprised under this variety have the following physical conformation:—The face is broad and flat, which either arises from the great development of the zygomatic arches, or from the distance between the parietal bones on each side of the head. There is often also a great depression of the nasal bones, which contributes to give a flat appearance to the face. The profile of the forehead is retiring or depressed, seldom found perpendicular. The profile of the jaws is prognathic or projecting, seldom found on a level with the forehead. The eyes frequently present the peculiarly called oblique. The skin is of a mixed character, never truly white, and very rarely of a jet-black; still it often presents what would be called a black or white colour. The eyes are generally of a dark colour. The hair, as a general rule, is straight, long, and black; in some instances it is curly—rarely woolly—and more rarely still light-coloured.

The languages of the people belonging to this variety are either characterized by the absence of cases (apotic), or having inflections to be shown to have arisen out of the union of different words (agglutinate). They are very rarely amalgamate.

The distribution of this variety is very wide over the surface of the earth. It finds its greatest development on the continents of Asia and America, and is to be entirely possessed of the earth. The Persians of northern and western Persia, the Kurds, the Belochoi, the Afghans, the Tajiks of Bokhara, and the Siapoo must all be regarded as
belonging to the *Japetida*. On the other hand, although we shall find the *Japetida* the principal occupants of Europe, there seems to be little doubt that the Lapps and Finns of Scandinavia, the Magyars of Hungary, the Turks of Turkey, the Parsees and Parsee emigrants of Persia, the Natives of British India, and probably even the Albanians or mountaineers of ancient Illyria and Epirus, all belong to the *Mongolida*.

From the analogy of language this variety is made by Dr. Latham, he adds to the whole of Central Asia from the Polynesian Islands, as well as those of America. Although at first sight the physical differences between the Asiatic *Mongolida* and the inhabitants of the islands of the South Seas and the continent of America might look so great as to be a sufficient ground for separating them into individual ethnological groups, yet it has been found that even physical characters fail to afford a line of demarcation. Thus, the late Dr. Morton, of America, thought that "the squared or rounded head, the flattened and vertical occiput, the high cheek-bones, the semi-elliptical, the large quadrangular orbits, and the low receding forehead," were characters that would distinguish the American from all other varieties. When however we examine the languages of the American continent we shall find that the Equinoxmax present so strong a relation to that of the other races that we cannot deny their affinity to the American races; and it is amongst the Equinoxmax that we find a departure from the physical type of a peculiar American form, and a strong relationship with the Asiatic Mongolida. It is in these relations as this which have induced ethnologists to regard the American Indian as a form of the variety of mankind to which the followers of Ghenghis Khan belong.

The influence of the races included under the variety of *Mongolida* must be regarded as rather material than moral. They undoubtedly form by far the largest portion of the human race, and occupy a considerable space in the history of the world. They have, by the sword, established some of the greatest empires that the world has seen. China is at this moment an example. Their empires have however crumbled to pieces, and left no deep impression on the world. Such is not the history of the *Altaicidae* and *Japetidae*, the first of which includes the Mongols and the Mohammedans, and the last the Greeks, Romans, and modern European races.

The *Mongolida* are divided by Dr. Latham into groups as follows:

1. *Altaic Mongolida*. The term *Altaic* is taken from the Altaic Mountains in Central Asia, these being a convenient geographical centre for the different nations and tribes composing this division. It embraces two stocks, the *Seriform*, and the *Turanian*.

2. *Seriform stock*. The *Seriform* stock has the physical conformation of the Mongol; and its languages are either wholly apotic or with only occasional inflection. The area inhabited by these people is China, Tibet, and the Indo-Chinese or Trans-Gangetic Peninsula as far as Malaya; the Himalayan and parts of the Sub-Himalayan range of mountains.

3. *Turanian stock*. In this stock the chief people are the Chinese, Tibetans, Boni, Siamese, Kambas, Burmees, the Indo; and several unplaced tribes are added by Dr. Latham.

4. *Turanian stock*. The *Turanian* stock has the physical conformation of the Mongold; the languages are not monosyllabic. They are found from Kamchatka to New Guinea, and from the Arctic Ocean to the frontiers of Tibet and Persia. The countries included are the northern parts of the Chinese empire, the greater part of Siberia, Mongolia, Tartary, Eastern Turkistan, Asia Minor, Turkey, Hungary, Esfahen, and Lapland.

5. *Tungusian branch*. The chief Tungusian group include the Tchepojirins on the Lena, the Lemerits on the Sea of Okhotsk, and the Manchou rulers of China.

6. *Tork branch*. This includes the Uighurs, the Turks of the Sandy Desert, Turks of Khoten, &c., the Kalmucks of the Russian empire, the Tibetans, Turks, and Uighurs of the Russian empire, and the isolated Yukats of the Lena.

7. *Ugrian branch*. This includes the Voguls, the Permians, the Tchermis, Finlanders, Esthoinians, Laplanders, and Hungarians.

**B. Dissierian Mongolida.** The term *Dissierian* is taken from a name ancient scribe Dissierius. The tribes included in it have a modified Mongol organisation, the languages are

(pancosyllabic) few-syllabled and agglutinate. Of all the languages not belonging to the Seriform stock of the last section they approach nearest to the apotic state. They are in common with the languages of the Mongold, of the *Ugrian*, the *Sami*, the *Legrians*, the *Mandchus*, the *Melqiti*, the Iron, and the Circassians.

Of this group, Dr. Latham observes, "To have used the word 'Caucasian' would have been correct but inconvenient. It is already misapplied in another sense, that is, for the sake of denoting the so-called Caucasian race, otherwise said to consist of Jews, Greeks, Circassians, Scotchmen, ancient Romans, and other heterogenous elements. In this sense it has been used in more than one celebrated work of fiction. In such and such only, it is otherwise than out of place as applied to these varieties."

**C. Oceanic Mongolida.** The epithet Oceanic is applied to this group, because, with the exception of the peninsula of Malacca, the tribes belonging to it are the inhabitants of islands exclusively. With the exception of Mauritius, the Isle of Bourbon, Ceylon, the Seychelles, the Maldives, and the Laccadives in the Indian and Japanese empires, with the islands to the north thereof in the Chinese Sea, every inhabited spot of land in the Indian and Pacific Oceans is inhabited by tribes of one and the same race which are embraced by this division. It is supposed that the human species spread over these islands, but apparently nowhere else.

"In the peninsula of Malacca," says Dr. Latham, "and on no other part of the mainland of Asia, is an oceanic tribe to be detected. Although united by Dr. Latham in the Mongold, it exhibits two extremes—the black, yellow, olive, brunette, or brown, with long, black, and straight hair. Another class is black rather than yellow; the hair is sometimes long and straight, but in other cases crisp, curv, frizzy, or even woolly. The social, moral, and intellectual difference between these two classes is more than their physical. The black division inhabits New Guinea, Australia, Tasmania, New Ireland, and the islands between it and New Caledonia. The brown division occupies all the rest of the oceanic area, Sumatra, Borneo, Java, the Moluccas, the Philippines, the South Sea Islands, the Carolinas, &c. The names given to these divisions are as follows:

1. For the lighter-complexioned straight-haired type—Malays, &c., *Altaicidae*;
2. For the type that partakes of the character of the African negro inhabiting New Guinea, Australia, and what may be called the continuous localities for the unmixed black—*Negrito*;
3. For the tribes with any or all of the Negrito characters, dwelling side by side with Malays in Malay localities, or in localities disconnected with the true Negrito area—the blacks of the Malayan area.

**D. Hyperborean Mongolida.** The physical conformation of this section is that of undersized Mongoldians. The languages are agglutinate, and the difference between these two classes is more than their physical. They are subject to either Russian or China. Their religion is either Shamanism or an imperfect Christianity. They are found on the coasts of the Arctic Ocean, and the coasts of the Yenisei and Kolim. The principal divisions are the Samoiids, the Venetsians, and the Yakibiru.

**E. Peninsular Mongolida.** This section comprises races very widely distributed. Some of these lie within the Arctic circle, others as far south as 26° N. lat. Their physical conformation is Mongold. Their languages are agglutinate, and the difference between the two classes is more than their physical. The races occupied by these races are the islands and peninsulas of the north-eastern coast of Asia. The people included in it are the Koreans, the Japanese, the Aino, the Koriats, and the Kamchatkals.

**F. American Mongolida.** This section embraces the original inhabitants of the whole continent of America. By the term Mongold they are Mongoldians as a distinct family. Their connection with Mongoldida seems however to be established by the Eskimo, who are physically Mongold and Asiatic, but philologically American. Of the Eskimo Dr. Latham remarks, "Unimportant as are the Eskimo in a political and historical view, their peculiar geographical position gives them an importance in all questions of ethnology; since one of the highest problems terns upon the affinities of this family."

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"It has long been known that the nation which inhabits Greenland and Labrador is the nation which inhabits the north-western parts of Russian America as well. It is found on the American side of Behring's Straits, and it is found on the Asiatic side also. So that the Eskimo is the only family common to the Old and New World; an important fact in itself, and one made more important still by the Eskimo localities being the only localities where the two continents come into proximity. Now if these facts had stood alone, unmodified by any phenomena that detracted from their significance, they would have been no more a mystery than the peopling of Europe. Such however is not the case. They neither stand alone, nor stand unmodified. The reasons that lie against what is at first blush the common sense notion that 'How have the Eskimos arrived?' are chiefly as follow with

1. The distance of the north-eastern parts of Asia from any probable centre of population—cradle of the human race, so called. For these parts to have been the passage, Kamtschatka must have been fully to overflowing before the Mississippi had been trodden by the foot of a human being.

2. The physical differences between the Eskimo and the American Indian.

3. The difficulties presented by the Eskimo language.

4. It is only these two last reasons to which I attribute much validity. The first of the three I put low in the way of an objection; that is, not much higher than I put the system of the Mongol, with the drifting of Japanese junks, and the effects of winds and currents upon Polynesian canoes. Without at present doubting whether the occurrences bare alluded to have happened since America was peopled by the present race, I limit my attention to the second, that is, to the question of how. And here, I believe, that by any such unsatisfactory processes the original population found its way; in other words, I believe that our only choice lies between the doctrine that makes the American nations to have originated from one or more separate pairs of progenitors, and the doctrine that either Behring's Straits or the line of islands between Kamtschatka and the peninsula of Allitska, was the highway between the two—worlds from Asia to America, or vice versa. I say vice versa, since it by no means follows that because Asia and America shall have been peopled by the same race, the original of that race must necessarily have arisen in Asia; inasmuch as the statement, that the descendants of the same pair peopled two continents, taken alone proves nothing as to the particular continent in which that pair first appeared. Against America, and in favour of Asia, being the birth-place of the human race—its unity being assumed—I know many valid reasons; reasons valid enough and numerous enough to have made the notion of the New World being the birth-place of two parts of man into which I know no absolutely conclusive ones. Omitting however this question, the chief primâ facie objections to the view that America was peopled from north-eastern Asia lie in the

1. Physical Differences between the Eskimo and the American Indian. Stated as he it stands in the Eskimo is essentially a Mongol in physiognomy. His nose is flattened, his cheek bones project, his eyes are often oblique, and his skin is more yellow and brown than red or copper coloured. On the other hand, in his most typical form, the American Indian is not Mongol in physiognomy. With the same black straight hair, he has an aquiline nose, a prominent profile, and a skin more red or copper-coloured than the native's. Putting aside marked characteristics, moral as well as physical, it is not surprising that the American should have been taken as the type and sample of a variety in contrast with the Mongol.

2. Philological arguments. Few languages, equally destitute of literature, have been better or longer known than the Eskimo. For this we have to thank the Danish missionaries of Greenland—Egea more especially. From the grammar of Fabricius' Eskimo, many Eskimo phonemes are translated into English. The next step was to become languages of low compound words, and of regular though remarkable inflections. It was known too to be very unlike the better-known languages of Europe and Asia. Finally, it has been admitted to be, in respect to its grammatical structure, at least different.

We need not here enumerate the various tribes embraced in this section, as it includes the whole of the original races found on the American continent.

G. Indian Mongolidea. The races belonging to this section are found in Hindustan, Cashmere, Ceylon, the Maldives and Laccadives, and part of Beloochistan. They are found mixed or contiguous to the Japeldes of Beloochistan and Cabul, and various Sermif tribes. They present two extreme forms, one with the skin dark or even black, the other of a brunette colour, with a skin of great delicacy and cleanliness. The social condition of caste prevails amongst them. The principal religions are Brahminism and Buddhism, with a variety of intermediate creeds. Their ancient literature is in the Sanscrit, and their alphabets are derived from that language. They embrace the following divisions: 1, the Tamuli; 2, the Pallindas; 3, the Brahli; 4, the Indo-Gangetic; 5, the Purbutti; 6, the Cashmirean; 7, the Ganglese; and 8, the Maldivian.

II. The Atlantidea. In their physical character the face is not so broad and flat as in the Mongolidea. The jaws project, are prognathic, whilst the nose is generally flat; the forehead is retiring; the cranial dolichocephalic, that is, there is less space between the parietal bones of the skull, whilst its length remains the same, than there is in the last variety; the eyes only rarely open obliquely; the skin is mostly jet-black, presenting however lighter shades, and very rarely approaching a pure white; the hair is crisp, woolly, very rarely straight, and still more rarely light-coloured. The languages among the Atlantidea belong to the so-called classical. They are seldom or never found with a truly amalga-

The great district of the development of the natives which are brought together under the above definition, is Africa. Perhaps the greater diversity of inhabitants than Africa, or races of men that at first sight appear so evidently distinct. All previous ethnologists have placed the Hottentot, the Negro, and the Brahman in a very different position to the Assyrian, the Babylonian, the Mohammedan, and the Jew; but in Dr. Latham's classification we find these brought together under the common variety Atlantidea. The analogy of language has led to this opinion; and the transition from the least to the greatest of these races is so gradual that no investigation of their physical structure with which we are at present acquainted, would be sufficient to break down the affinity discovered in their languages. No part of Africa seems to be inhabited by any race but these of the Atlantidea. The Syro-Arabian or Semitic nations, however, which are now classed amongst the Atlantidea, are found occupying a considerable area in the south-western part of Asia. The people of these races are far removed from the Negro and the Hottentot, and the Semitic has none of the great symmetry of form, and considerable cerebral development. However small may have been the influence of the lower types of this race on the world, there can be no doubt of the vast impression produced by the Semitic nations. We may here pass over the nations of the ancient Chaldean, Egyptian and Babylonian empires, and fix attention on the religious history of the Jews. Here, amidst the surrounding Paganism, we find the worship of the one true God maintained by this small race amongst the Semitic nations; and through them the religion of Christ, which is destined to react on all the other races of mankind. It is also among these races that compound of Judaism and Christianity, Mohammedan, has sprung up; and however inferior it may be to the Christian religion, can by no means be said to have any beneficial influence it has exerted on the races who have embraced it.

The following is Dr. Latham's division of this group:—

A. Negro Atlantidea. The negroes have a black, unctuous, and soft skin; the hair woolly; lips thick; maxillary profile prognathic, frontal profile retreating; nasal depressed. They inhabit the low lands, sea-coasts, and bulrushes. The rivers, deserts, savannah, Caumba, Gambia, and Upper Nile. They are nearly limited to the tropic of Cancer. They are divided into Western Negroes, Central Negroes, and Eastern Negroes.

B. Kaffir Atlantidea. The language of the Kaffir supplies a broad distinction between them and other Atlantidea races. Their physical conformation is modified negro. They occupy a district in Africa (east and west) from the north of the equator to the south of the Tropic of Capricorn. The chief divisions are, 1, Western, 2, Southern, 3, Eastern, 3 C
C. Hottentot Atlantaide.—"The Hottentot stock," says Dr. Latham, "has a better claim to be considered as forming a separate race, than any other section of mankind. It can be shown bowever that the language is no more different from those of the world in general than they are from each other." The Hottentots occupy the southern extremity of Africa. They are of a low stature; limbs are very long; the hair is brown or yellow; their complexions are light; cheekbones prominent; nasal profile depressed; hair in tufts rather than equally distributed over the head. They are divided into the Hottentots proper and the Saabs. The latter are found between the Reggoveld and the middle portion of the Orange River.

D. Nilotic Atlantaide.—These people have a modified negro conformation, and inhabit the water-system of the Upper and Middle Nile. Their chief divisions are, 1, Gallas; 2, Agous; 3, Nubians; 4, Bishari.

E. Amanirgh Atlantaide.—Amanirgh is a term equivalent to Berber. These people are found on the coasts of the Mediterranean and the whole north-western quarter of Africa. They present modifications of both the negro and Arab types. Their chief divisions are, 1, the Siwahs of the Oasis of Siwah, the ancient Ammonium; 2, Kabyles of the range opposite to Atlas. The Tuaricks of the Sahara; 4, Ounanches of the Canary Islands.

F. Egyptian Atlantaide.—This section includes the ancient Egyptians, the subjects of the Pharaohs and the Ptolemies, and the modern Copts as far as they are of unmixed blood. They extend probably from the Nile, from Egypt, to the Mediterranean. The physical conformation of the ancient Egyptians is gathered from their mummies. The modern Copts have the hair black and crisp or curled; the cheek-bones projecting; lips thick; nose depressed; nostrils wide open; mouth large; a yellowish to a dull-brown; eyes oblique; flat and tall and fleshly.

G. Semitic Atlantaide.—This section embraces the most highly developed forms of the Atlantaide. The Semitic races are found in Abyssinia, Arabia, Palestine, Syria, Mesopotamia, part of Kurdistan. They are light-complexioned, and referable to three types—the Arab, the Jew, and the Kaldani. Their influence on the world has been pre-eminently moral, spiritually as well as intellectually. Their religions are pre-eminently monothestic in the later parts of their history. Their alphabet is the earliest in the world, and, with the exception of the Ethiopic, is written from right to left. The chief divisions, which are more or less artificial, are Syrians, Assyrians, Babylonians, Phoenicians, Egyptians, Ethiopians, Cappadocians, Elamites, Cyprians, Philistines, Canaanites.

With the Beni-Terah (sons of Terah), father of Abraham, are found the Jews, who are remarkable amongst the nations of the east for their early intellectual culture, and for the moral and religious influence their writings have produced on the world.

III. JAPETIDE.—This variety includes most of the nations of modern Europe. Physically, they present characters superior to the two other varieties. Their face is not flat, and is moderately broad. The jaws project but little, the nose is often very prominent, and the frontal profile is not uncommonly nearly vertical. The skull is shaped generally as the last; the opening of the eyelids is straight, and very rarely oblique; the skin is white, or bronde; the hair is never woolly, varying much in colour, frequently very light; the eyes are black, blue, or gray. The great European races are very apt to become fastidious, and have many acquired inflections. In a few instances they are allucinated.

The Japetide form the principal part of the nations of Europe, they do not exclusively occupy this district of the world; they are found in the valley and delta of the Nile, as the Nubians; in the region of the Levant, as the Syrians, Assyrians, Babylonians, Phoenicians, Egyptians, Jews, Cretans; in Egypt, Ethiopia, Cappadocia, Elamites, Cyprians, Philistines, Canaanites.

With the Beni Terah, sons of Terah, father of Abraham, are found the Jews, who are remarkable amongst the nations of the east for their early intellectual culture, and for the moral and religious influence their writings have produced on the world.

The influence of this variety of mankind on the history of the world, has been much greater than that of the other two. If we add to the Semitic races those due to the truth of Christianity, its adoption and propagation in a pure form has been mainly due to European nations. It became early identified with the civilization of Greece and Rome; and passing from the nations where it obtained its early triumphs, it has spread over the world, the religion of the great Anglo-Saxon race, which on both sides of the Atlantic is increasing with extraordinary rapidity.

Dr. Latham divides the Japetide into two divisions—Occidental and Indo-Germanic.

A. Occidental Japetide include the races called Celtic or Kelts. The Keltic languages were separated from the common mother-tongue subjoined to the evolution of the persons or words, but anterior to the evolution of the case or object of the grammatical inflections. The present area of this race is Britain, Wales, the Highlands of Scotland, the Isle of Man, and Ireland. The original area occupied by the Kelts, which have been constantly removed, is the Scottish Lowlands, England, Gaul north of the Loire, and part of Switzerland. It is probable also that they occupied parts of Baden, Bavaria, and northern Italy. The Taurisci of the Tyrol, the Scordisci of Illyria, the Galts of Asia Minor, the Celt-Iberians of Spain, and the Germanic races of northern Germany are generally regarded as the Kelts.

They have two types of complexion in the British islands: the Sibarian type having eyes and hair black, complexion dark, and ruddy tinge, and chiefly found in South Wales; the Hibernian type having gray eyes, yellowish, red, or sandy hair, and light complexion; they are found in Ireland. Dr. Latham gives the following as their chief divisions:—

1. Kelts of Gaul, falling into—\(a\). the proper Cels; \(b\) the Belgae. Both extinct or incorporated.

2. British Kelts, falling into—\(a\). the Cambrians; \(b\) the Picts, which are extinct or incorporated.

3. Gauls. \(a\). Scotch Gauls; \(b\). Irish Gaels; \(c\) Maxmets, or Celtic Kelts of the Isle of Man.\n
These are the Kelts, extending from the Ettruscans to the Iberian frontier.

Their line of population seems to have been from Celts and Dunkirk to England, from England to Scotland, and from Scotland to Ireland.

B. Indo-Germanic Japetide.—The language of this group were separated from the common mother-tongue subjoined to the evolution of the cases or classes of nouns. They are less evidently allucinated than the Keltic. This and the previous group are sometimes called Indo-European, and thus embracing all the Japetides. The Indo-Germanic Japetides are divided into two classes—

1. European Indo-Germans.—These are divided into—


1. The Goths embrace—

a. The Teutons, which are again divided into—

1. Meogoths.

2. High Germans, including Hessian, Thuringian, Franconian.

3. Low Germans, including—

1. Batavians.

2. Saxons, embracing—

* Saxons of Hanover, and Anglo-Saxons of England.

** Saxons of Osnaburg and Westphalia.

*** Nortdalbingian. Extinct.

3. Frisians.

4. Scandinavians, embracing—

1. Icelanders.

2. Swedes.

3. Norwegians.

4. Danes.

2. Sarmatians. This comprises the Lithuanian and Slavonic divisions, and these are divided into—

1. Of the Lithuanians Dr. Latham says—

1. Of all the Japetides they preserved their original paganism longest.

2. Of all the Japetides they have had the least influence on mankind.
The Slavonic division includes—

a. Russians.

b. Servians.

c. Holstein.

d. Poles.

e. Serbs.

f. Polabic Slavians.

3. Mediterranean Indio-Germans. These include the Greeks and Romans of antiquity, and their modern descendants.

II. Persian and antiquity,地中海 that the Persian.

• Ulvrians. Such a position, he was at the beach, and February was thirty-seven years. Snipe of the Snipe.

MANN.

3. Of the Japets, they speak a language nearest in structure to the Sanscrit.

3. Mediterranean Indio-Germans. These include the Greeks and Romans of antiquity, and their modern descendants.

II. Ayran Indio-Germans.—Dr. Latham says the whole of this class is hypothetical. It includes the Parthians, who embrace the Kurds, the Balochi, the Afghan, the Siaposh, and other contiguous races in Asia. The unplaced stocks are the Armenians and Iberians.

(Dr. R. G. Latham, Varieties of Man; Lawrence, Lectures on Man; Dr. Lankester, On the Physical History of Man; in Family Tutor; Nott and Gilbod, Types of Mankind; Dr. Latham, Ethnology of British Colonies, Ethnology of British Islands, Migrations of Man, Ethnology of Europe; Dr. Pickering, Races of Men; Dr. Frichard, Physical History of the British Archipelago.)

MAN, FOSSIL. [Anthropology, S. 2.]

MANBY, CAPTAIN GEORGE WILLIAM, the author of several inventions applied to the saving of life in shipwreck, was born at Hilgay in Norfolk, on November 25th, 1765, at his residence Pedestal House, Southwell, near Great Yarmouth, on November 18, 1854, thus having nearly completed his eighty-ninth year. He adopted the military profession, but appears to have retired from any active duty after he had attained the rank of captain in 1803, when however he was appointed barnack-master at Great Yarmouth. Here in February 1807 occurred the loss of the Sniepe gun-brig, when he saw sixty-seven persons drowned within a few yards of the beach; and, in the same gale, so many vessels were lost, that forty-seven dead bodies were cast upon a line of coast about thirty miles in extent. Such calamities induced him to devise means of assistance by throwing a line over the vessel. This was at first proposed to be done by a baleta; but a successful experiment with a small mortar, when he threw a line over a church, led him to prefer the use of gunpowder. The great difficulty to be overcome was as to the connection of the shot with the rope. Chains broke on the discharge. At length, stocking strips of raw hide closely plaited, were found to answer, and on the 12th of February 1808, when the crew of the brig Elizabeth was in imminent danger, about one hundred and fifty yards from the beach, having lashed themselves to the rigging with the sea breaking on them, Capt. Manby's mortar was instantly fired, and in what would have been a hopeless position, Captain Manby threw a line over the vessel, a boat was hauled off by it, and the crew of seven men were brought to land. In the same severe winter Captain Manby rescued the crews of several vessels by similar means. In 1818 his services were brought before the House of Commons. A committee was then appointed on the subject of the saving of life in shipwreck. The merits of previous inventions for the same object were brought before that committee, especially the Patent Bell invented by Bell of Forth, who in 1793 had communicated to the Society of Arts a plan for throwing a rope from a mortar from the vessel itself, and to whom 50 guineas had been awarded after some experiments were performed. That plan however would have been obviously very difficult of application in the case of a vessel in a raging sea. Captain Manby having been reported of with high approval by the Committee, received a pecuniary recompense from the Exchequer, and was employed to report upon the means of the coast from Yarmouth to the Fifth of Forth. He advised that mortars, constructed on his principle, should be stationed at various points; in 1814 the House of Commons addressed the Prince Regent on the subject; and within two years, one station was established. The attention which was thus given to the subject of the preservation of life in cases of shipwreck, was further expressed through associations which were formed throughout the country chiefly by Captain Manby's exertions. He also contrived means of obtaining a sight of a vessel on a dark night, by the use of a description of firework throwing stars to burn at a certain height; and he suggested the use of shells, filled with a burning composition, to allow the crew to discover the sight of the vessel. His plan of manufacture of ropes to prevent mildew and rot, dressing vegetable mucilage, and using a solution with sugar of lead and alum in equal parts; and he suggested various improvements in life-boats. Late in life he visited the Northern seas, chiefly on the North Coast of Staffa, and invented a harpoon which he had invented. For his various inventions, which were the means of saving upwards of a thousand lives, he received at various times 7000L. from the British nation, and the thanks of the chief sovereigns of Europe.

MANDAMUS. The Writ of Mandamus, mentioned P. C. v. xiv. p. 347, and which can only be obtained in the Court of Queen's Bench, is now usually termed the Prerogative Writ of Mandamus, in order to distinguish it from the writ mandamus which is applicable in certain cases in all the other Superior Courts of Law.

The proceedings by Prerogative Writ of Mandamus may be resorted to, as has already pointed out, in cases where a public inconvenience or a private wrong is occasioned by the omission of a public duty, and no sufficient remedy is afforded by an action for damages. This remedy was originally confined in its operation to a limited class of cases affecting the administration of public affairs; such as the election of public officers, or compelling them to proceed in matters within their jurisdiction, or public officers to perform duties imposed upon them, as to make a rate and the like. But in more recent times it has been extended to cases in which the rights of private individuals only are concerned. In such cases, the writ of Mandamus is passed for making railways, docks, bridges, improving towns, &c., &c., and, in almost all of these Acts, there are provisions directing the company obtaining the Act to do certain works for the benefit of individuals; such as substituting new buildings for others necessarily removed, making new communications in lieu of old ones, and other works of a similar nature. In the event of noncompliance with these enactments, the remedy is by mandamus. This mode of proceeding has been termed in Pandolfini, a case that was authoritative, the procedure therein has been very materially altered and amended by the Common Law Procedure Act, 1854, the proceedings being now assimilated as much as possible to those in an ordinary action.

The remedy hitherto afforded by this prerogative writ, in cases where the public were interested, has, by the same statute, been extended to cases in which private rights only are concerned. The plaintiff may claim in his writ the performance of the duty which the defendant is bound to perform. The claim must be repeated in the declaration, which must set forth sufficient grounds for the claim, and show that the plaintiff is personally interested therein; that he sustains or may sustain damage by the nonperformance of the duty, and in the event of noncompliance the party against whom the writ is directed has been demanded by him, and refused or neglected by the defendant.

Where judgment is given that a mandamus do issue, the court, if it shall see fit, besides issuing execution in the ordinary way for the costs and damages, may also issue a peremptory writ of mandamus, commanding the defendant forthwith to perform the duty to be enforced, which the defendant must obey; for no return, except that of compliance, will be made by the court, although time to return the writ may, upon sufficient grounds, be obtained.

If the defendant fails either to obey or to return the writ, two courses are open to the plaintiff. He may cause the defendant to be arrested; or, in lieu of proceeding by attachment, the court may upon his application, direct the act required to be performed by the writ to be done by the plaintiff himself, or some other person appointed by the court, at the expense of the defendant; and upon the act being done, the expense of such act and the costs of the suit, both by the court, who may order payment of the amount of such expenses and of the costs, and enforce payment thereof by execution.

MANGRO-TREE. [Manigreta.]

MANIHOT. [Japinha, S. 2.]

MANIN, DANIELE, a distinguished Italian politician and patriot, was born at Venice in 1804, the son of Pietro Manin, a respectable advocate. His grandfather, Lodovico Manin, bore the same name as the last doge of Venice, whose weak behaviour at the time of the extinction of the
ancient republic by Bonaparte (1807) had attached a certain discredit to the name. Young Manin, who from the first showed great abilities, was bred up to his father's profession of the law, and graduated as Doctor of Laws at the University of Padua at a very early age. He married in 1836, and shortly afterwards commenced practice as a lawyer. He had the reputation of being a man of letté,

The chief of his career was the Austrian rule and the general aspiration after restored liberty and independence for Venice. Though not affiliated to any of the revolutionary societies then existing in Italy, he often discussed with several intimate friends—especially Alexandre Zaccagnini, the 18th-century novelist and Francovich, Giacomo Tagliaparti—his dreams of native country, and the possibility of remedying them by insurrection or other means. Once or twice—as during the time of the excitement caused by the affair of the brothels Bandiera in 1844—these secret communings were on the point of bursting out into open action; but, on the whole, it was felt by the friends that no movement was practicable, and Manin continued in the ordinary exercise of his profession, varying it by occasional contributions on economical topics to journals.

As a speaker, he was distinguished for a logical, direct, positive, and incisive manner, different from the ordinary eloquence of his countrymen. As on several important public trials he acted a vigorous part in the liberal side, he came to be a chief of the Austrian government; and in the early part of 1848 he was imprisoned. But this year was to witness a change in his fortunes, and in those of Italy. On the 18th of March the spirit of insurrection with which the Venetians were inflamed was carried forth not only by Manin from Milan; the news of the expulsion of the Austrians from Milan acted immediately on Venice, and on the 23rd of March the Austrian commander of the city, Count Zichy, was obliged to surrender, and the republic was declared. It was at this time that Manin considered himself as a man born to lead. The progress of events was for a time complex—the fate of the Venetians being involved in that of the other Italians. "What we preferred," Manin afterwards said, "was to be independent, without being in a situation to be confederated with the other Italian states; but what we would have accepted was, to become a portion of one great kingdom comprising all Italy."

The war of Charles-Albert, the king of Piedmont, against the Austrians in the name of Italy, as a whole seemed for a while to give likelihood to the latter expectation. The Venetians, willing to show their trust in Charles-Albert agreed to the fusion of their little republic with Lombardy and thus to form a united Kingdom of Northern Italy. But the battle of Custoza having ended that dream, and restored Lombardy to the Austrian dominion, the Venetians again fell back upon their own resources and prepared for a separate defence. The republican standard of Manin was raised; a committee of three was appointed to carry on the executive government, Manin being the chief of the three; and the military command was intrusted to the Neapolitan general Pepé, who had thrown himself into Venice two months before, rather than obey the order that he should return to Naples. Though the Austrians kept up a blockade against Venice, it was not till March 1849, when the second attempt of Charles-Albert was brought to an end by the defeat of Nevaro, and when the Austrians were obliged to reconquer, then to be reconquered their lost territories in Italy, that the Venetians endured the full agony of the struggle. By that time the patriotic movement had been completely crushed in every part of Italy, a small town near the exception of Rome. The two republics of Rome and Venice were the sole remains of the insurrectionary work of the previous year; and against the one of these the French were mustering their power in conjunction with the Austrians and Neapolitans, and Manini's was signaled by them. Both republics behaved bravely. What Manini was to Rome, Manin was to Venice. From March 1849 he was invested with all the powers of the dictatorship. The definition of his power selected by him is one of the most gallant and obstinate in the history of Italy. He was on the 3rd of July that the French entered Rome; but Venice did not surrender till the 24th of August, after it had suffered a dreadful bombardment. With the fall of Venice the re-

subjugation of Italy was complete. The terms of the surrender were such that Manin was able to go safely into exile. He afterwards resided chiefly in Paris, supporting himself honourably. He died September 28, 1857.
most eminent anatomists. They give a feature to the herp-
etology of the middle portion of the secondary epoch. Now,
of the five marked genera constituting this group, as at present
determined, are: *Iguanodon*, *Hesperosaurus*, *Pelorosaurus*, and *Re-
nothosaurus*—to Dr. Mantell. Worthily then were the Wol-
ston Medal and Fund adjudicated to our lamented colleague in
the very-esteemed County History Society of Sussex; the late Edward Wed-
slowly, F.S.A. In the "Bibliotheca Zoologica et Geographi"
of Agamaist and Strickland, no fewer than sixty-seven works
and memoirs of various degrees of importance and length, are
enumerated as having proceeded from Dr. Mantell’s pen; to
these must be added his numerous antiquarian papers, and several
professional disquisitions.

**MARBOU. [BROM.]**

**MARE. [HOUSE.]**

**MARPE TA.** [HIPPURIS, &c.]

**MARECA. [DEF.]**

**MARGAREMIDE. [CHEMIST, &c.]

**MARGARIN. [TIFERR, ORGANICO, &c.]

**MARIOL. [CALCENDA, &c.]

**MARKET-ROSWORTH [LORD BUTLETH.]**

**MARKET-RAVEN. [LINCOLNSHIRE.]**

**MARMOLITE. [MINERALOGY, &c.]**

**MARSH AND SERBOURQUE LOUIS VIEME DE MARECHAL DUC DE RAGUSE,** the son of
the Chevalier de Marmont, an old officer of distinction, was
born at Châtillon-en-Seine, on the 30th of July 1774. He
entered the army as an ensign in infantry in 1789; but
afterwards, on the death of his father the comte de Marmont,
who had been general, he was adopted, in 1792, to the Artillery School of
Châlons. Towards the end of that year he served in the campaign of
the Alpes, under General Montesquieu. He was present
at the siege of Toulon, December 1793; and having been
adjudged a 1st class of the Legion of Honour, he was
sent him, in 1794, to the Artillery School of Châlons.

For the great insur-
rection of the people, he was given a captain's
commission, as aide-de-camp, and a captain in the
campaign of Syria, in 1796; he was appointed commander in
Alexandria, and defended that city against the English
and Turks, in a season of famine and pestilence. When General
Marmont was recalled to France, on his return from Egypt,
August 22, 1799, General Marmont was one of the seven officers
selected to bear him company in his perilous enter-
prise.

During the crossing of Mount Saint-Bernard in the spring
of 1800, Marmont's plans for the conveyance of the guns
having been adopted, he superintended the entire transport,
and by his persevering efforts the passage of this important
arm was effected. He fought with much distinction at
the battle of Marengo, June 14, 1800, and was immediately after-
raised to a division. After the peace gained by this victory,
he was made inspector-general of artillery; he then applied
himself zealously to various reforms in the service, especially
for the accelerating of the transit of the artillery train.
All these improvements were sanctioned by the First Consul,
though the young military reformer was only in his twenty-
seventh year.

In the campaign of 1805, General Marmont was
present at the capture of Ulm, October 9, 1805; and he was
successively employed in the reduction of the province of
Syracuse. Henceforward he commanded armies. In 1806 he
was sent to command the army in Dalmatia, where he acted
as general-in-chief for several years. On the 2nd of October,
he was sent to the army in Greece, and at the battle of
9000 Montenegrins, Greeks, and other troops, sustained by a
second corps of 7000 Russians. During his occupation of
the duchy, Marmont carried out a beneficial system of public
works, including a great line of roadway, 210 miles in
length, for which useful improvement he received his title of
Duc de Raguse in 1808. When the campaign of Wagram
opened in 1809, Napoleon called this general to support his main army. Marmont took the field with a corps of 9000 infantry, only 300 cavalry, and 12 pieces of cannon. With this force, which had never before been seen in the campaign, he advanced against several severely contested engagements; and then encountering General G Giulay, at the head of 35,000 troops, posted on the Drave, compelled that general to retreat to Hungary. After these successes he joined Napoleon the day before the battle of Jena, on 6th July, 1806, and, in the action, and received his marshal’s baton for his conduct in that arduous engagement. This decisive victory being followed by the treaty of Vienna, the Austrian government made Marmont commander in the provinces of Dalmatia, Ragusa, and Croatia, with other adjacent lands, which Napoleon formed into a single state, under the title of the Illyrian Provinces, and placed them under the direction of Marshal Marmont as governor-general. In this high office he continued nearly nineteen months, giving the peninsular to supersede Marshal Massena in the command of the army of Portugal. Though independent in his command, he hastened to unite his army to that of Soult, placed himself under the orders of that eminent leader, and assisted him in relieving the fortress of Salamanca. On July 22, 1812, he displayed however many proofs of skill as a general before he retreated, nor did he leave the field until he and the two generals who succeeded him had been dis- solved by severe wounds. In the campaign of 1813 the marshal did not participate. He began the campaign of Silesia, took Dresden, and was present at Tautzen, May 20, 1813; at Dresden, August 26, and at Leipzig on the 16th, 17th and 18th of October. In this last battle he defended the village of Schonfeld, which was taken and retaken seven times. Eight of his generals were either killed or wounded in the action; four horses sank under him, and he was twice wounded.

His name appears again in almost every battle fought on the French soil, in 1814, for the defence of his country. He terminated this campaign, perhaps the most brilliant in his career, by the battle before the walls of Paris, on the 30th of March 1814. The enemy, consisting of Russians, Prussians, and Austrians, were more than four to one, yet Marmont maintained his post for several hours, not surrendering even when the heights of Montmartre had been taken, and the first Russian gun had begun to sweep the Boulevards within the city; and it was not till some hours after receiving a letter from his superior general, Hydro, authorising him to withdraw, that Marmont and Mortier called a council of general officers at an inn within the suburb of La Villette, when they agreed to the evacuation of Paris.

The Duc de Raguse entered the French capital on the 1st of March, and Marshal Marmont, on the 4th of April, after a short correspondence with Prince Schwarzenberg, stipulating for the retirement of the French troops into Normandy, with arms, baggage, and artillery, entered the allied lines, and thence marched to Verailles. It was this step, taken without the sanction of Napoleon, which afterwards drew down upon him so much odium.

The Duc de Raguse was now wedded to the cause of the restored dynasty. He accompanied Louis XVIII. to Ghent in 1815, returned to Paris with that sovereign after the battle of Waterloo, and was employed repeatedly both by that monarch and Charles X. in offices of great trust. At the outbreak of the July revolution in 1830, he was charged with the invincible duty of quelling the revolt, and having failed, became a second time the mark of almost universal obloquy. To satisfy the popular indignation, he was struck off the list of the French army, and exiled from France. He spent his years of banishment in visiting different countries, and in writing works of considerable extent on the history of Russia, Austria, and other states. Nearly twenty-two years after his disgrace, he died at Venice, on the 2nd of March, 1852, in his seventy-eighth year. The publication of his "Memoires," in 9 vols. 8vo., Paris, was completed in 1857.

MARRAST, ARMAND, who succeeded Carrel as chief editor of "Le National," was born in 1802, in the south of France. After being educated at the College of Pons- levoy, he went to Paris in 1827, and immediately con- menced his career of politics by writing pamphlets against the government. The pungent and playful humour of these light productions drew notice upon the author, and he at once made for himself a distinct position among the young men of letters. His name is associated with the first French political newspaper, "Le National," and the period of its editorship is marked by a notable display of that political energy that characterised his career. His wit and satire, and the vigorous logic of his brilliant brochures against Consisnisme.

In 1830 Marrast established the newspaper "La Tribune." It became the organ of the ultra-liberal party, and as such he was then sought after by foreign as well as French journals. It contained very bitter articles against the government of Louis Philippe, and the fines to which it was condemned, together with the law-suits attacking its defence, put an end to its publication after a few years. Marrast then published his celebrated pamphlet, "Vingt Jours de Secret," which pro- duced a great sensation, and much increased his popularity. Proceedings were taken against him by the ministry. He sought refuge in England, remained several months in London, and continued his daily journal "Le National," as his ability to "Le National," and married an English lady during his sojourn in this country. These letters were the origin of that long connection with Armand Carrel and "Le National," which afterwards gave to Marrast the influence he had over the public. He was an ardent supporter of the revolution of February 1848, a period of nearly twelve years, Marrast conducted that journal, and maintained him in the high position it had acquired under Thiers, its first editor, and then under Carrel.

During 1847, a series of exciting incidents rapidly followed one another, highly favourable to Marrast's satirical ability. At the same time, other events of the year, another, rumors of bribery and corruption among men high in office; next, these rumors were succeeded by frequent exposures or confessions; and lastly, came the scandal of assassination in the mansion of a great noble. The repub- lican journals made the most of these incidents, and "Le National" took the lead in denouncing the government and the court. The revolution of February, and the abdication of Louis Philippe followed. Pending the crisis of this event, the commune of Paris was, for the time, the representative of the people, and the government; and depictions visited Marrast, and received their instructions from him. His name was now on every tongue; and when Lamartine was placed by the rapid pro- gression of events at the head of the provisional government, Marrast, an arbitrary, after being on terms with Paris, was finally president of the National Assembly. This last office was limited by a new regulation to one month; but the urbanity of the new president, and his extraordinary influence over the 900 members in consequence of his ability, is calling them to order by humorous appeals, caused him to be re-elected several times. To him likewise was committed the task of drawing up the new constitution. But the republicans party soon found that Marrast was not adverse enough for them; they began to estrange him as a moderate, and his popularity fast declined. On the 15th of May 1848 the insurgents, headed by Barbès and Blanqui, forced their way into the Hôtel-de-Ville, their first cry being "Where is Marrast?" We must make in end of that soft-handed repub- lican!" But he had withdrawn for concealment to a private chamber which was not searched. After the insurrection of June, and the consequent dissolution of the Lamartine cabinet, Marrast retired into private life. We believe he still continued to "Le National," and long after being its editor, until the paper was suppressed by the government of Louis Napoleon. He died on the 10th of March 1832.
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tract of marriage merely before the Superintendant Registrar, to have the ceremonies of the church or of their own persuasion added at any time afterwards. The object of this enactment is to permit the couple to satisfy their religious scruples which, after the merely civil form of the contract has been resorted to, may arise or be suggested to them.

(Mr. Kerr's ed., vol. 1, p. 464.)

MARRYAT, FREDERICK, was born in London on the 10th of May, 1792; was entered at Christ's Hospital, and received his education at Rugby; in 1810 he entered the Royal Navy, and was sent to America as a midshipman. Under this daring commander he was engaged in upwards of fifty actions, of more or less importance, off the French and Mediterranean coasts during the next three years. In one he was left for dead on the deck of a ship which he had boarded, and only recovered when a fellow midshipman, who had a grudge against him, touched his supposed dead body with his foot, and began to moralise in rather uncompromising terms on his premature exit from life. The reputation for gallantry and ability which he acquired under Lord Cochrane, was amply sustained by his conduct under other commanders. Lord Cochrane, on becoming Commander-in-Chief of the Channel Fleet, appointed him his midshipman. On four or five occasions he saved men from drowning by leaping overboard, at the risk of his own life. On one such occasion he saved the life of a son of William Cockburn, the Member for the Borough of Wimbledon, and an officer in his Majesty's Navy. On another occasion he leaped overboard in an attempt to save a sailor's life, he fond of their human and becoming the prelude of one of three sharks that were following the ship; and he had been given himself over for lost before he was picked up. In 1812 he was appointed to the post of Lieutenant on board the Esquile, whence he removed to the New Castle, sent under Lord George Stuart, to cruise off the American coast. He attained a commander's rank in 1813. In 1820 he commanded the Alliance, of 74 guns, the force which had been sent to the relief of St. Domingo, and which had been involved in the affairs of the French revolutionists. In 1822 he commanded the soldiership of 17 guns, and in 1825 the sloop of 18 guns, and was trusted with the command of the East Indies squadron.

Marryat was sedulously reared in the British navy, and of all English ships in the world, he could have been but of one of the Royal Society. His early life was spent in writing and for the most part in the factory of novel production. Captain Marryat was a Fellow of the Royal Society.

MARS, ANNE-FRANCOISE-HYPOLITE BOUTET, known as MADEMOISELLE MARS, was born in Paris on the 9th of February, 1778; her father being the actor Monvel the Elder, a French actor who had been appointed to the Théâtre-François, and who was known as Mars-Boutet. She appeared before she was ten years old in juvenile parts, and in 1803 she already filled in the Théâtre-François, what on the French stage are called 'les rôles d'ingénues.' She met with a generous patronage of Mademoiselle Contat, then the leading actress in comedy, and received from her the best training for the cast of characters which her early talents pointed out as her own. After she had made herself familiar with these parts of the young girl, she was induced, still directed by Mademoiselle Contat, to attempt 'les jeunes amoureuses;' in which character she succeeded to the first place, after the retirement of Mademoiselle Méfray and Lange in 1798. She was then twenty.

Her fine talent was very gradual in its development, nor did the public notice that she had actually appeared until 1803 that her first marked success had obtained. In that year the part of a deaf and dumb pupil of the Abbé de l'Épée, in the piece of that name, having been assigned to her, she played it with dignity, and grace in its performance, that from that night she took rank as one of the great comic actresses. Her talents rapidly increased under the influence of cordial encouragement. Her kind instructor, Mademoiselle Contat, took an active part in the stage in 1824; abandoning the inheritance of 'reprôts' to be divided between Madeleine Mars and Mademoiselle Lervard, which gave rise to a long contest between the rival stars. The former however soon distanced her in all competencies. She stood at the head of all French actresses in genteel comedy, gaining a new success in every new part, down to that of Mademoiselle de Belle-Isle, in Dumas's drama, which she played for the first time on the 2d of April, 1839, when she had passed the age of three-score.

You, although she never refused to take the leading characters in plays of the new school, and in each achieved a new triumph, she was to the last opposed to the modern romanticists, and generally required extensive changes to be made in her own parts. She was not at first blush beloved by the public, and at certain times embarrassed by her criticisms and strictures, and the latter, in his 'Mémoires,' has described some piquant disputes of this nature between the actress and the dramatists. She went on to adhere to her own, but her genius had already become so august, that none could rival her, especially in the comedies of Molitor. In the lady of fashion, in the coquette of the beau monde, every spectator felt the collected self-possessing, the fullness of attention with which she performed these characters. It was her resolves will and extraordinary abilily which alone kept alive a respect for the earlier dramatic literature in the house to which she belonged, when a dozen theatres and fifty modern dramatists were endeavouring to subvert it.

Those who have occupied the stage on the stage, can form no idea of the simplicity, the seeming artlessness, the graceful elegance of her acting; nor of the music of her voice, so distinct that the very letters seemed printed in it, nor of the exquisite expression of her smile. Her form was very fine, her gait easy yet majestic, her costume remarkably elegant and distinguished. She was one of the shareholders of the Théâtre Français, and her yearly rent from this source amounted to 40,000 francs; and, in 1816, Louis XVIII. settled on her a pension of 20,000 francs. The hotel in which she resided was one of the most celebrated foreign as well as native artists and literati, some of whom were daily to be seen paying their court to her. She was sedulously attentive to the critics and public in general, and was said to have been admired by all her performances. On the night of the 7th of March 1841 she appeared for the last time on the boards of the Théâtre Français, in the 'Misanthrope' and the 'Fausses Confidences.' It was of course a benefit night, and for the last time she performed the parts of Célimène and Araminte. She
died on the 30th of March 1847, her death having been accelerated, if not caused, by the habit of having her hair dyed every ten days. She left behind her a fortune of 800,000 francs.

MARSHESEA. The Court of the Marshalsea and the Palace Court were abolished by the statute 12 & 13 Vict., c. 101. Their procedure and the costs of actions therein had for some time before been the object of animadversion by the late Mr. Franks, but the Government has recently well founded, amounted to no more than the universal complaint of the costs incident to legal proceedings. The Palace Court had never before been reputed by Royal Commissioners to be one of the best in the metropolis.

MARSILÈCAZ, or RHIZOCARPE, Peppers or RHIZOCARPUS, a natural order of Aquatic Plants, with creeping stems bearing leaves, which are usually divided into three or more leaf-stalks, and that a circinate vernation. The fructification is produced at the base of the leaf-stalks, and consists of sporocarps and inflorescences inclosing clustered organs, which consist of antheridial and pistillidial cells. The germinating body has an ovate form, and occasionally a mammillate on one side, whence roots and leaves proceed. The species are all inhabitants of ditches or inundated places. They do not appear to be affected so much by climate as by situation; thus they have been detected in various parts of Europe, Asia, Africa, and America, chiefly being of the warmer and healthier regions. The species number about 20, the principal of which are—Platinaris, Marsilea, Azolla and Sulinaea. (Balfour, Class-Book of Botany.)

MARTIN, JOHN, was born at a house called the Eastland Ends, Haydon Bridge, near Hexham, Northumberland, on the 19th of July, 1789. His early ambition being to become a painter, his father, as the best way of turning his desire to profitable account, apprenticed him to a coachmaker at Newcastle (whither the family had removed) to learn herald-painting. Here however he only remained a few months; and, his inductures having been cancelled, he was sent back to Italy by his father in 1801. His Italian patron of Muss, the father of Charles Muss, who acquired some distinction as an enamel painter. With him young Martin removed to London in September, 1806, and soon after, not getting on very pleasantly in his master's family, took lodgings for himself; and, as he relates in some autobiographical notes contributed to the Athenaeum' (see 'Ath. for 1854, p. 246, to which we are indebted for the leading facts contained in this notice), 'at this time, by close application to studies, an inquisitive turn of mind, and though often subjected which has since been so valuable to me. I was, at this time, during the day employed by Mr. C. Muss's firm painting on china and glass, by which, and making water-color pictures, I was enabled to make a livelihood. In fact, my struggle was so hard, and the success so meager, that I was forced to give up painting and to earn my bread as an engraver. In 1843, I took up again painting as a means of livelihood, and I continued to work in this manner until the time of my death.'

His marriage stimulated him to aolder concre. He determined to paint large pictures, and by a month's application produced in 1812 his first work, 'Sphinx in search of the Waters of Oblivion.' Before it left his hands his hopes received a severe blow: he 'overheard the men who were to place it in the frame disputing as to which was the top of the picture, the back or the front. I made, however, the frame in the frame the top of the picture would not be again in danger of being taken for the bottom. It found a place in the Royal Academy Exhibition, and, what was better, a purchaser for ten guineas, in Mr. Manning, a bank director. He followed up his success by sending to the British Institution an 'Exhibition from Paradise,' and to the Academy in 1814 'Clytie,' a work which was hung in the ante-room, as it was also larger and more ambitious picture, 'Joshua conducting the Israelites through the British still-life exhibition, where the 'Joshua' was again exhibited the following spring, it was placed in a post of honour, and awarded the prize. Martin was excessively angry with the Academy for the treatment of his grand work, and the breach was never healed. He resolved never to have his works accepted by the Academy except engravings. This, as long as he lived, kept him from writing books as a candidate for membership, and as a necessary consequence, according to the laws of the Academy, he never received any academic distinction. With the picture itself, and the success it met with, he was however abundantly satisfied. "The confidence I had in my powers," Martin writes, "was justified, for the success of my 'Joshua' opened a new era to me. In 1816 I removed to a superior house, and had to devote my time mainly to executing some immediately profitable works; but in 1819 I produced the 'Fall of Athene;' and the art world was second to the attention it excited. The following year came 'Macbeth,' one of my most successful landscapes; then, in 1821, 'Belshazzar's Feast,' an elaborate picture, which occupied a year in executing, and was reserved the receiving of 3000l. from the British Institution.'

These works, and especially the 'Belshazzar's Feast,' were of a kind then quite new, and took the London public by storm. A sturdy opposition was raised; but for the time it was fruitless. The public was swelled into a tornado, no doubt loudly declared—and pretty widely believed—that a new era was opened to art, as well as to the painter's self; and the engravings quickly made the artist's 'austere style' familiar from one end of the island to the other. Now was he slow to follow up his success: 'The Destruction of Nineveh' in 1822; the 'Serenth Plague' and the 'Papian Bowser;' in 1824, the 'Creation;' in 1826, the 'Deluge;' and in 1828 'The Fall of Nineveh,' perhaps the most popular of all his pictures after the 'Belshazzar.' He was now, however, so much engrossed with engraving, and with various schemes for the improvement of London, and other engineering projects, that for a while his pencil was somewhat less diligently employed, and when he resumed painting in 1830 he discovered that the spell which had been raised over his earlier pictures indeed found admirers, but they were few as compared to those which greeted his earlier works, and infinitely less enthusiastic. Yet he went on to the last painting which he did; it was a large picture of a family portrait, that he painted long before he died, as having captivated the public eye. Thus during the last twelve or fourteen years of his live he painted—'The Death of Moses,' and 'The Death of Jacob,' 1838; 'The Eve of the Deluge,' 'The Assaying of the Waters,' 1840; 'The Celestial City and River of Life and Flame,' 1841; 'The Deluge,' 1849; 'Christ stilling the Tempest,' and 'Canute the Great, rebuking hisCouriers,' 1843; 'Morning,' and 'Evening,' 1844; 'The Judgment of Adam and Eve,' and 'The Fall of Man,' 1845; 'The Deluge,' 1846; 'Pharaoh's Dream,' 1847; 'Arthur and Zige,' in the Happy Valley, 1848; 'The Last Supper,' 1850; 'Valley of the Thames viewed from Richmond Hill,' 1851.

The last picture he exhibited during his life was a 'Scene in a Forest—Twilight' (1850). He was now engaged on a series of three grand paintings, illustrative of the 'Last Judgment,' which he fondly hoped would be his master-work, and he laboured steadily at these till a few weeks before his death. Then suffering under a paralytic attack he set out in the hope of the cure. He died at his house in Battersea, on the 9th of July, 1854, at the house of Thomas Wilson, Esq., he died February 9th, 1854. His remains were interred in the lonely cemetery of Kirk Bradden, on the Starng Road, a few miles from Douglas, where his father had been buried. He was the last of his race, one of Wraith,' and 'The Plaisir of Heaven,' have since his death been exhibited in London and the provinces. As might be expected from the nature of the subjects, and the circumstances under which they were painted, suffering under the infirmity of age, with mind and body both subdued, they are comparative failures, having all the worst faults and mannerisms of the painter's earlier pictures, and only few of their redeeming excellences.

Martin was not the original painter, and possessed a very considerable share of imagination; and in the expression of material grandeur and terror,—the vastness and might of nature, in contrast with the weakness and littleness of man,—he was eminently successful. At least until by repetition the conception had been rendered common-place and imnpressive, this was unquestionably the case; and the unparalleled popularity of his early pictures, while the manner was new, could be readily understood. But Martin did not perceive that his was a trick of style which would not wear. He kept on repeating the same subject, and he kept on with interminable vistas of buildings, piles upon piles, as buildings never could have existed in reality, and crowding the roads and fields with myriads of little insignificant figures. He added to this, as the evening approached, with flashes of jagged lightning or streams of dazzling sunshine; never advancing beyond a harash and niggling torch, or attaining to anything better than a crude and conventional system of colour. Seeing only two, or at most three, of his pictures, he might be pronounced a man of
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gens; seeing all, while acknowledging his talent, it is
difficult not to feel surprise at his deficiencies of taste, ob-
servation, and judgment.
It has been said that during many years the subject of the
improvement of London occupied much of his time and thought.
As early as 1829 his ideas had taken a definite
shape, and he gave them to the public in a 'Plan for sup-
plying with pure water the Cities of London and West-
improving the western end of the metropolis,' and he continued
his labours in the north of England, and laboured earnestly at
himself heart and soul to the peaceful agitation, he had the
beauty to see within a few months no less than a
500,000
converts in Cork alone. Extending his sphere of action
he commenced a 'progress' through the west of Ireland,
where proportionate results were seen; wherever he went
his name was familiar, and the pledg
pledge of temperance were so numerous, that they could
only be kept in control by the military and police.
and the same results followed in all the towns which he visited
in Ireland. In 1837 he, with the aid of 
127 poor
law machinery, the Society was incorporated, and
and its articles of
existence were published in London, and the
ers were
insured that the agitation thus kept up constantly, solely by
himself, has resulted in a vast alteration in the quantity and quality
of the water supplied by the companies, and in the estab-
lishment of a Board of Health, which will, in all probability,
eventually result in the supply of wholesome water to the peace-
unging.
Amongst the other proposals which I have advanced
is my railway, connecting the river and docks with all the
railways that diverge from London, and apparently approved
by the Railway Terminus Commissioners, as the line
which the public is for the first time permitted to cross by
me, and which is described in their report; - the principle of rail adopted by the
Great Western line; the lighthouse for the sands, appropriated by
Mr. Walker in his Maplin Sand Lighthouse; the flat anchor
and pontoon which I recommended in 1825, and which,
I believe, have not been abandoned; the jetty at East
harbour and pier; iron ship, and various other inventions of
comparatively minor importance, but all conducing to the
great ends of improving the health of the country, increasing the
produce of the land, and furnishing employment for
the people in remunerative works.

MARTINSITE, A Mineral, which is composed of 91 per
cent. of chloride of sodium and 9 per cent. of sulphate of
magnesia. It comes from the salines of Hafhurst. (Dana,
Mineralogy.)

MARTOC. [Somersetshire.]

MARYSVILLE. [California, S. 2.]

MASHAM. [Yorkshire.]

MASCOTT. [Lead.]

MATERIA MEDICA [Therapeutica, S. 2.]

MATH, THE REV. THEOBALD, the Apostle of
Temperance in Ireland, was born at Thomastown, county
of Tipperary, October 10, 1790. His father, an illegitimate
member of the family of the earls of Llandaff, died while
his grandfather, the fourth earl, and Theobald was enabled
by the kindness of the Countess of Llandaff and Lady Elizabeth
Mathew, to proceed to the academy of Kilkenny, and after-
wards to St. Patrick's College, Maynooth, where he remained
until he was ordained a priest of the Roman Catholic Church
in 1814. He was appointed to the parish of the Inch
and the neighbouring town, in which he resided seven years,
where his influence was great among the rich and the poor
alike; on his appointment to this mission he received from
the pope, Gregory XVI., the degree of D.D. with a dispensa-
tion enabling him to hold property. After the
abrogation of the Penal Laws and the freedom of the Press
which followed, the sufferings of the inhabitants of
Cork was the establishment of a religious society for
the purpose of visiting the sick and needy, on the model of the
societies of St. Vincent de Paul: this institution obtained
the approbation of the Right Rev. Poor-Law Commissioners
in 1854. About four years later he was requested to lend
his aid to a temperance association formed in Cork. He
joined the association and became its president; and devoting

Mehemet Ali, Pasha of Egypt, was born in the town of Cavalla, in Romii, about the year 1769. He began life as the keeper of a small shop in his native town; but having ventured into the army, he gained the rising of all the Albanian forces of the Albanian governor of Candia by his zeal in suppressing a rebellion of the pirates of that island. In 1799 he headed a contingent of 300 Caidian soldiers in an expedition to Egypt, where he conquered the Egyptian forces of the Ottoman ruler of the island of Candia by the French. Here he laid the foundation of his military renown and of his political ascendancy. On the evacuation of Egypt by the troops of the Emperor Napoleon I., the Sultan nominated, as viceroy of Egypt, Mohammed Khoeïrov; but the Mohammedan Khoeïrov, to save himself from the sexual influence, of which they had been deprived during the occupation of their country by the French, chose Mehemet Ali as their viceroy. In 1806 he was made Pasha of Cairo, to which in the following year was added the Pashalic of Alexandria, as a reward for his services rendered to the Ottoman Empire. No sooner however had he gained this pitch of power than he turned against his old confederates the Mamelukes—470 of whom he murdered in the citadel of Cairo in a violent assault on the Mameluke warriors. He passed through the country: an end was thus put to a turbulent and formidable race, which had kept Egypt in a state of anarchy and warfare for upwards of 400 years. After the destruction of the Mamelukes, Mehemet Ali made himself master of the country. He obtained the government of that part of the country, the revenue of which he considerably increased by raising the land-tax and the custom duties on its internal trade. In 1811 he was sent against the Wahabie, a fanatical sect of the Moslems, who had pillaged the holy city of Mecca and Medina, and whom he subdued after six years of constant warfare, and at a vast sacrifice of men and money. When the Greek insurrection against the Porte broke out, he offered to take part in the revolution; his fleet was sent to the Moros in the summer of 1834, under Ibrahim Pasha, who however was obliged to retire after the battle of Navarino in 1827. In 1830 the administration of the island of Candia was confided to Mehemet Ali; but he had greater schemes in his view. He aimed at obtaining possession of Syria; and pleasing as an excuse his desire to recover possession of some of the Egyptian possessions which had settled in that country, he invaded Syria, with a large army under Ibrahim Pasha, and soon reduced it to subjection. Syria as well as Egypt were entered upon as a kingdom in the third year of the reign of the viceroy of Egypt could not remain content with his own vice- regal territory; and peace was only made between the viceroy and the sultan [Mehmet II.] by the interference of the Great Powers in 1833. Sulyman Ali on his acknowledgment himself a vassal of the Porte. He remained in quiet possession of Syria as well as Egypt until 1838, when his nominal master, the Sultan, jealous and weary of the sway of so formidable a rival, sent an army and fleet to expel him from Syria; and when he found that this was impossible, he sought and obtained the co-operation of England and the other European powers. In the summer of 1840 the combined fleets appeared before the coast of Syria; in the autumn of the same year the Egyptian army was defeated near Beyrut, and both that city and Acre were captured, and Alexandria itself blockaded. Mehemet Ali was obliged to come to terms, and abandoned his claim to Syria, on condition of the Pashalic of Egypt being made hereditary in his family. He continued to administer the affairs of the country until September 1848, when he resigned the reins of government into the hands of his son Ibrahim Pasha, on whose death he passed to Abbas Pasha his grandson. Mehemet Ali himself lived only a few months after these changes. He died at the age of about eighty years. His wife and concubines he had six children; two of his sons he sent to Paris for the sake of education. He died at Cairo with great pomp and magnificence.

Mehemet Ali was tolerant in matters of religion to an extent rarely known among Mohammedans. His constitution was strong, his stature short; his features, though dark and stern, were animated and expressive. He was very ambitious, yet particularly sensitive to the opinion formed by others as to his public policy. His government has been extra-

vagantly praised by some writers; but it certainly was more rational, orderly, and enlightened than that of most of the combinations of the Porte. He augmented justice with partiality, established police and law-courts, abolished torture, and encouraged education. He did his best to remove the prejudices felt by his countrymen against the introduction of the arts and sciences of Europe; he even went further and made use of the machinery in his dominions, including a printing office for the publication of a periodical journal. He also formed schools and colleges for teaching the arts and sciences and of farming, which has since been followed by the Viceroy of Barcy in the liberal laws. His government was essentially despotic and absolute; and in order to support the expenditure necessary to maintain the institutions already mentioned as having been introduced by him, he was obliged to have resorted to a heavy increased taxation, and for his army to a enormous

Upon the whole, however, it must be admitted that the Albanian peasant was in his day a great benefactor not only to his country but to society at large. Gifted with an admirable talent for organisation, he was introduced to one of the most neglected and disorganised of countries the first conditions of a civilised state, order and security, to such an extent that it is said that a traveller, laden with gold, "could pass through the streets of Alexandria without an armed guard," even from the Taurus to the frontiers of Abyssinia, between sea and Nile and desert." In the administration of justice and the general management of his empire he introduced more of equity and settled principle than exists at the present time in many parts of the Ottoman Empire. He did his best to ennoble the sons of his subjects and to protect the Christian population. He not only encouraged commercial intercourses with Europe, but in a great measure created it; and by various enterprises of a grand and striking character, awakened that beneficial spirit of freedom by which the Ottoman nation had lain dormant in Egypt. He first called into life the cultivation of cotton, indigo, and sugar, which has since been pursued with increasing success—a large portion of the produce being sold in Europe and Asia, and the proceeds being used to support his army and navy. He determined to mean to build a fleet and to form an army trained after the European fashion. Such are the means by which the Albanian peasant, who only learned to read in his thirty-fifth year, and who often, but with his head in safety, became a powerful prince, who twice made the Ottoman Sultan tremble on his throne at Constantinople, and whose personal energy and public importance gave him a place among the potentates of the earth.

Melamin [Cherneur, S. J.]

Melampryne. [Cherneur, S. J.]

Melanospermum, or Fucalide (Harvey), the first subclass of the class Aceae. It consists of plants of an olive-green or olive-brown colour. "Eucratization monocious or dicious; spores olive-coloured, either external, or contained singly, or in groups, in proper conceptacles, each spore enveloped in a transparent skin (perispore), simple, or occasionally divided into several spores; anthidia, or transparent cells, filled with orange-coloured viviparous corporules, moving by means of vibratile cilia. It includes the following orders:

Fuscosporae. Spores contained in spherical cavities immersed in the perispore. [Fuscales.]

Sporoloinaces. Spores attached to external jointed filaments, which are either free or compacted together in knob-like masses.

Laminariae. Spores forming indefinite cloud-like patches covering the whole surface of the frond.

Dictyostilae. Spores forming definite groups (sori) on the surface of the frond.

Cordariaceae. Frond cartilaginous or gelatinous, composed of vertical and horizontal filaments interlaced together. Spores immersed.
Edoscopon——Fond aliform, jointed. Spores external.

Williamstown, originally. The advanced is but lower whilst for a

The MELISSIC is situated

MELILLA, a genus of plants belonging to the natural order Labiatea. It has anthrae approaching in pairs and forming a cross bursting longitudinally. The upper lip of the corolla flat, entire, straight; lower lip with 3 rounded nearly equal lobes; calyx membranous, bell-shaped, ample, variously lobed and toothed. 

M. Melittisphylum, Bastard Balm, has oblong, ovato, or slightly cordate leaves. The upper lip of the calyx with 2 or 3 teeth; flowers purple, with a white margin, or variegated in different ways, large, stem 1 or 2 feet high. M. grandiflora (Smith) has a height. They are both found in woods in the south of England.

MELKSHAM. [Whiteways.]

MELOSIRE, a family of Diastomes, formed by Kitting. The species are strait, not having a central opening on the secondary side. The stirrups are interrupted in the median line. It includes the genera Galionella, Melosira, Pediastrum, and others. Meneghini, in his 'Natural History of Diatomea,' makes the following critical remarks on this group:—

"The Melosira in general may be regarded as polytrophic associations of Cyclotella, and the comparison prevails principally in the second sub-genus. The distinction of the two sub-genera is also proposed by Hassall (Sphaerocysta, Melosira, Callolenas) ; but the specific names in the majority of this are at present given to the genus itself of a bishop; a corporation town with a mayor; the residence of the lieutenant-governor; and the seat of government.

The gold finding in the colony, which appears to continue without much diminution, attracts numerous emigrants to Melbourne, especially from Great Britain; but the population of the city is probably now more than 40,000. Vessels of 200 tons can ascend the river to Melbourne, larger vessels lie in Hobson's Bay. Williamstown, the port of Melbourne, is a small town built on a low sand-flat at Point Grillbrand, on the south side of the entrance of the river. There are some good houses. A railway connects Williamstown with Melbourne city. By means of a pier at Williamstown, having a communication with the railway terminus, bottles and goods may be landed and sent on to Melbourne.

MELDRUM. [Aberdeenshire, & 1.]

MELILLA, a sea-port town of Maroccon belonging to Spain, is situated 11 miles S. from Cape Ras-ad-Diir, or Tres-Focos, in 36° 8' 15" N. lat., 2° 56' 9" W. long., and has about 2000 inhabitants. The town stands on a peninsula about 40 feet above the sea, and united to the mainland by a rocky isthmus. Melilla is one of the Spanish presidios on this coast. It is impregnable on the land side, and towards the sea it is defended by large batteries. The town has large magazines and citadels, and small vessels can enter the harbour. The presidio of Peñon-de-Velez and Alhucemas, or Alhucemas, two strong fortified rocky islands between Cape Tres-Focos and Melilla, are also under the governor of Melilla. The Spanish garrison of Melilla numbers about 1000. The rest of the inhabitants are for the most part convicts and exiles. Melilla is said to derive its name from the Spanish word for honey, which is gathered of superior quality on the mountain slopes along this coast.

MELISSIC ACID. [Chemistry, & 3.]

MELITTA (Kirby), a name for a genus of Insects belonging to the order Hymenoptera, and to the tribe Meliffera of Latrille. The genus as originally constituted by Kirby embraced all the Honey bees known at that time. This genus is now split up into numerous smaller ones. Leach divides the Meliifera into two families, Andrenida and Chrysididae.

The Andrenidae include the following genera:

England trace Were works, of youthful child, describes them as the same organic condition, and hence arises a fresh doubt respecting the systematic value that has been ascribed to it.

In general we may also say, that in the *Melodram* the development of the lateral surfaces prevails over that of the primary ones, which we find finally to disappear in certain genera (*Pteridium, Podostea*), as well as in some species of *Melobesia* (variae, *orchidacea*), the increased length of the axes and the corresponding development of the primary surfaces: and it is to be observed, although the plan of the family the primary surfaces differ precisely as much in form as they do in the three preceding ones, yet we find in these the same organic character as in the greater number of the preceding ones. Consequently, the primary forrows or canals. The separation of one lateral surface or valve from the other, with the consequent dilatation of supero-lateral surfaces, which the primary surfaces exhibit before the duplication takes place (though verified to some degree in other genera, yet by the Art in its present state, better than elsewhere, represents an undeniable analogy with the reduplication of *Desminia*, which Brébisson distinguishes from the deduplication of *Diactinum*. The particular disposition of the internal surface of the lateral valves has never been ascertained, a centre, the enlargement of some articulations, and the dilatation of the interstitial ring, are isolated facts, which however merit particular attention in the pædax of our knowledge.

MENACANITE. [TITANIUM.]

MENDHUS. [MAIZE.]

MENDELSSOHN. FELIX MENDELSSOHN-BARTHOLDY, one of the greatest musicians of the present century, was born at Berlin, on the 3rd of February 1809. His father, who was the head of a great banking-house, on his marriage adopted the name of his wife's family in addition to his own. He had embraced the Lutheran faith, and his son was educated as a Lutheran. When he was in his infancy, his father removed from Hamburg to Berlin, where he resided till his death, enjoying a distinguished place in the society of the Prussian capital. He bestowed the utmost care upon the education of his son, who showed, at a very early age, singular attainments, not only in the art to which his genius especially directed him, but in various branches of literature and science. While yet a child, he gained the affection of Goethe, who was a friend of the family, and published letters in which astonishing man contains many touching expressions of his love for the youthful Felix and prognostications of his future greatness. He was even then remarkable for his amiable disposition and simplicity of mind; qualities which he retained unimpaired to the end of his too short life. As was in the case of almost every great musician—of almost every great artist: indeed of any description—Mendelssohn's genius showed itself even in infancy. He tried to play almost as soon as he could walk. His great talents received the best and earliest culture. Zelter, the friend and correspondent of Goethe, was his chief instructor in music, and his progress was almost as marvellous as that of Mozart. Indeed his first works, which were afterwards published, were in advance of anything till that time exhibited at an early tender age. His three quartets for the pianoforte, violin, and violoncello, written before he was twelve years old, are not merely surprising juvenile compositions, but masterly works, which continue to be constantly performed, and hold their place among the classical music of the age. He was in his sixteenth year when his opera, 'The Wedding of Camacho,' was produced on the Berlin stage, more, it has been said, from the wish of his proud and happy parents than his own, for the most moderately modest and always formed a part of his character. It was favourably received; but, as it betrayed some inexperience in composition for the stage, it was withdrawn by his friends. It was however published; and, though it is not generally known to the public, many copies of it have been sold, and it has been especially admired in Germany. The famous *Ferruginea* (M. ochracea, Ralfs), which he proves not to belong to the class of *Diactinum*.

"We shall find, as a character common to them all, the circular figure of the vertical section parallel to the lateral surfaces, of which the rayed disposition of the striae upon the lateral surfaces, we shall find repeated in the family of *Coscindotaces*, which, having the shield of a cellular structure, belong to the tribe of *Dioideae*. Perhaps we may suspect some *Melobesia* (*ulica, decussata, titrate*), to be furnished with the same organic condition, and hence arises a fresh doubt respecting the systematic value that has been ascribed to it.

In general we may also say, that in the *Melodram* the development of the lateral surfaces prevails over that of the primary ones, which we find finally to disappear in certain genera (*Pteridium, Podostea*), as well as in some species of *Melobesia* (variae, *orchidacea*), the increased length of the axes and the corresponding development of the primary surfaces: and it is to be observed, although the plan of the family the primary surfaces differ precisely as much in form as they do in the three preceding ones, yet we find in these the same organic character as in the greater number of the preceding ones. Consequently, the primary forrows or canals. The separation of one lateral surface or valve from the other, with the consequent dilatation of supero-lateral surfaces, which the primary surfaces exhibit before the duplication takes place (though verified to some degree in other genera, yet by the Art in its present state, better than elsewhere, represents an undeniable analogy with the reduplication of *Desminia*, which Brébisson distinguishes from the deduplication of *Diactinum*. The particular disposition of the internal surface of the lateral valves has never been ascertained, a centre, the enlargement of some articulations, and the dilatation of the interstitial ring, are isolated facts, which however merit particular attention in the pædax of our knowledge.

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the national instrument, who are chiefly retainers of great families, and assemble annually in the Edinburgh theatre to concert the Sacred Harps, and who have on more than one occasion displayed the most brilliant company of the metropolis—a relic of Scottish feudalism still preserved. To the surprise of his cicerone, who merely wished to give him half an hour's amusement, Mendelssohn remained to the last, immersed in what he heard, and showed, at the same time, as sincere and cordial appreciation of the powers of the performers. Many years afterwards, the same friend heard the celebrated symphony in A minor (now called the Scottish symphony) performed for the first time in London, at a concert of the Philharmonic Society. Struck with the strains of Highland melody which characterise that piece—the festive dance, the gathering, the warlike march, the lament—he was about to make some remark to Mendelssohn, when he said: "I told you that the symphony is a fine orchestral piece too, 'The Isles of Fingal,' is full of the impressions made upon his mind by the wild and stormy shores of the Hebrides.

In the following year he was for some time in Italy; and two years afterwards he visited Paris. From thence he came a second time to London; and from that time, we believe, to the end of his life, there was scarcely a season in which he did not visit England. He began even then to feel that he was possessed of a country of his own; and thenceforward England became, as it were, his adopted country, and was associated with the most important circumstances of his artistic life. His treatment at that time by his own countrymen appears to have inspired him with different impressions. It has been said, that "the great cabals which were always at work against him at Berlin increased his dislike to that city so much as to induce him to leave it, as he then thought, for ever. He left Berlin for Leipzig, where he accepted the directorship of the famous Gewandhaus Concerts, and where he remained till the year 1844, when he was induced, by the pressing request of the King of Prussia, to return to Berlin.

The admission upon his glorious career as a composer of sacred music may be fairly ascribed to the committee of the Birmingham Festival; for he set about the composition of his first oratorio, 'St. Paul,' under the arrangement that it should be performed under his own direction at the festival of 1837. And it was so performed accordingly, having been previously produced at Düsseldorf and Leipzig.

The performance of this oratorio in the Town-hall of Birmingham on the 30th of September 1837, was an event memorable in the annals of music in England. It was got up by the two gentlemen whose names appear as the principal subscribers to the foundation of the Birmingham festivals of that town are distinguished. The impression which it made upon an immense assembly will long be remembered by those who were present. Mendelssohn was again in London in 1840, when the proceedings of the Festival were 'given,' or 'Hymn of Praise,' composed expressly for that festival, was performed under his own direction. This remarkable work, called a 'Sinfonia-Cantata,' in which the powers of vocal and instrumental music are equally employed in developing a grand design, had a great success, and like 'St. Paul,' was speedily reproduced in the metropolis, and at all the great music-meetings in the kingdom.

His third and last oratorio, the greatest of all—'Elia,' was also written expressly for Birmingham. Though he undertook it immediately after the production of 'St. Paul' in 1837, it was not performed till 1846; and during these nine years, it occupied a large share of his thoughts and his labours. When the time for its production drew near, he returned for a season at Berlin, and gave up every other occupation, in order to devote his whole powers to this work. The poem, in which the principal events in the life of the Hebrew Prophet are related in the language of the Bible, was constructed by Mendelssohn himself; and the English version, and executed and adapted the merits of this admirable skill by Mr. Barrowclough. The first performance took place on the 26th of August 1846, the performance being conducted by the author. The enthusiasm it excited cannot be described. It was probably the first time he had ever written to the order of the instrument, except the cloth, but the greatest oratorio given to the world since 'The Messiah': and this judgment has ever since been strengthened and confirmed, not merely by the opinions of connoisseurs and critics, but by the united voice of the British nation. The production of this immortal work was the crowning glory of Mendelssohn's career. He was again in London, in 1847, to superintend its performance at Exeter Hall by the Sacred Harps, and was four times performed there, and afterwards, under his own direction at Birmingham and Manchester. Soon afterwards he left England, never to return. His health had for some time been declining. Shortly after his arrival at home, he received a shock in the same week which slightly resembled him in character and talents, and to whom he was fondly attached. From this blow he never recovered. He was persuaded to visit Switzerland, where, living quietly in the bosom of his family, he regained his strength and returned home to his father's house, more than ever convalescent. But he soon relapsed, and at length sank under his malady, an affection of the brain, and expired November 4th, 1847, before he had completed his thirtieth year. He left many manuscript compositions, the greater part of which were placed in the hands of several eminent musicians, friends of his family, with a view to selection and publication; but none of them have been given to the world except a fragment of an Oratorio, entitled 'Christa,' and some scenes of a romantic opera. The suppression of all the others, some of which were known to be works of magnitude and importance, has excited much surprise and dissatisfaction.

In a sketch like this, it is impossible to speak in detail of Mendelssohn's music; but it is sufficiently known that his highest powers were displayed; and 'St. Paul' and 'Elia' will descend to posterity along with 'The Messiah' and 'Israel in Egypt.' Mendelssohn was exposed to none of the cares, struggles, and vicissitudes which genius is too often heir to. Happy in all his domestic relations, in the enjoyments and triumphs of his art, and above all, happy in a pure and blameless life, few men have had a more enviable lot than Felix Mendelssohn.
Penny elongated; nuts also more decidedly traumatic, the Whiting is obvious, in the jaws, fins, lateral line, colour, and vertebrae."

"M. deceptrix (Gadus deceptrix, Linnaeus), the Coal-Fish. This is decidedly a northern fish, but being a hardy species, is not without considerable range to the southward. It was the only fish found by Lord Mulgrave on the shores of Spitsbergen, and the fry, only 4 or 5 inches long, were caught with the trawls off the western coast of Davis's Strait, during the first voyage of Captain Sir E. Parry. It is found on the coast of the United States. It abounds in all the northern seas, and in the Baltic, and may be said to swarm in the Orkneys, where the fry all the months of summer and autumn. As an article of food it is more prized when small than when of large size. The flesh of specimens weighing from 15 to 20 lbs. is usually dried or salted. This fish has more provincial names than any other species, some of which only refer to it when of a particular kind of appearance, other names are given according to the physical state. Thus it is called Silcock, Pillock, Coth or Ruth, Harbis, Cudden, Sethe, Sey, and Oray Lord. In Edinburgh and about the Forth the young are called Pollieys, at Newcastle the fry are called Drysey, and when 12 inches long Pooldams. The Coal-Fish may be traced on the Irish coast from Waterford along the eastern shore to Belfast. When detained and well-fed in a salt-water pond they attain a large size, and are very bold and voracious. The head and body are elegantly shaped, the eyes large and dark, the skin silvery white and nearly straight; the upper part of the head and back above the lateral line almost black, much lighter in colour below the fins, becoming greyish-white with golden reflections on the sides and belly; pectoral, caudal, and dorsal all dusky-black; ventrals and anal fins greyish-white; the upper jaw rather the shortest, the lips tinged with purple red, the mouth black, the teeth very small, the irides silvery white, the papil black."

"M. eels (Gadus eels, Linnaeus), the Pollack. This fish is much less abundant on some parts of the coast than the Coal-Fish, but like that species is an inhabitant of the seas all round our shores. The fish is called Lythe in Scotland, but whether from its supple plant activity, or from 'it's a fish on which the Pollacks fish' is not decided. The Pollack is caught at Hastings and Weymouth, also in Devonshire, where it is sometimes sold as Whiting. When only 12 or 14 inches long it possesses a considerable portion of the flavour and delicacy of that fish. It is also caught along the Irish coast under the names of Pollack, Laith, and Lythe. The body is elongated; the upper part of the head and back above the lateral line olive brown, the sides dull silver white mottled with yellow, and in young fish spotted with dull red; the lateral line dusky, curved over the length of the pectoral fin, then descending and passing in a straight line to the tail; the dorsal fins and tail brown; the pectoral and anal fins edged and tinged with red or purple."

"M. eels (Gadus eels, Linnaeus), the Green-Cod. This fish was first added to the list of British fishes by Sir Robert Cullum, and if a distinct species, as some doubt if, is not only abundant, but has an extensive range. It is mentioned as an essay the longest; the maxillary bone terminal, and is taken on the coast of Scotland, the Isle of Man, and on the Cornish coast. By some it is thought to be the young of the Coal-Fish, and by others as the young of the Pollack. The northern naturalists, who have opportunities of making comparisons, are of opinion that there is no agreement of the specimens from the abundance of both, consider them as distinct species. It seems to combine in itself the colouring of the Pollack, with some of the peculiarities of the Coal-Fish, but appears also to be deeper for its length than either, though if the young of a large species, judging by analogy, that would not be the case. The subject in its present state is open to investigation, and invites the attention of those who are so located as to be able to obtain examples of both."

"MERTENSIA, a genus of Plants belonging to the natural order Boraginaceae. It has a calyx in 5 deep segments; corolla bell-shaped, with a short thick cylindrical tube with 6 minute protuberances in the throat; stamens inserted beyond the throat; filaments elongate; style simple; nectaries smooth, inflated, rather drupaceous, attached laterally near its base by a flat stalk; seeds free."

"M. maculata is a prominent branched stem; leaves ovate-rounded, with a short acicular appendage from the abaxial, glabrous, fleshy, glaucous; nuts smooth; flowers in racemes, purplish-blue; protuberances in throat of the corolla yellow; leaves with a flavoured resembling that of oysters; nuts free, forming a pyramid longer than the calyx; pericarp membranous; seed smaller than the cavity. It is found on the northern seashores in Great Britain."

"MERULA. [Blackbirds.] MESACONIC ACID. [Chemistry, S. J.]

"MESITINE SPAR, zinc or iron carbonate of iron and manganese. It occurs in yellowish rhombohedrons. Its hardness is 4.0, and its specific gravity 3.0 to 3.6. It includes much that is called Rhomb-Spar, or Brown Spar, which becomes rusty on exposure to the atmosphere."

"MESITYLOE. [Chemistry, S. J.]

"METACETONE. [Chemistry, S. J.]

"METEOROLOGY. To the article in the 'Penny Cyclopaedia' on this union of sciences applied to the investigation of the better understanding of the phenomena of the air, the meteor, and the heavens, may now be added some account of two or three important subjects, our acquaintance with which has recently been greatly improved."

"M. following is a condensed statement of the present condition of knowledge upon these subjects, which are connected in a remarkable manner with cosmical science, and with almost every department of physics and of the study of inorganic nature. It includes the subject of the meteor and comets, and the interrelation of a branch of physics with the study of which little attention has yet been given—the explanation and interpretation by means of our present knowledge, of the numerous relations of such phenomena which occur in ancient history, both classical and medieval, and the statements in the popular historical literature of more recent periods.

The spaces through which the bodies of the solar system and the planets pass extends about the universe by celestial bodies comparatively minute, but in number incalculable; which, in common with the smaller true planets of the system have received from certain astronomers and physicists the appellation of Asteroids, or minor planets, which have the same origin and the same ancient origin of any luminous object seen in the heavens. These smaller asteroids, when they approach within a certain comparatively small distance from the earth, are, or subsequently become, the objects termed shooting-stars, fireballs, and igneous meteors; new species of phenomena being successively presented by them as they come nearer to the earth's surface, and especially in many instances, in consequence of their finally passing through a great extent of the atmosphere in an oblique direction, so as to experience the effects of its increasing density, both physical and chemical, throughout a trajectory of great length. But in this general statement it is not pretended to deny that objects and phenomena very different in their origin and nature, as well from each other as from those now understood, may probably be included also under the popular or only half-scientific designations of meteors and shooting-stars."

The appearance of these meteors is in many cases attended or accompanied by a red or metallic fire, or solid objects, either stones, metallic iron, or in some cases both mingle together, in the same black, forming a series of bodies collectively termed Meteorites (or Aerolites, 'Penny Cyclopaedia'), consisting, mineralogically, of two principal groups, graduating into each other: one of these the Iron-Cast, the other the Iron-Ball.

The visible meteor, when observed at those distances which must be within the atmosphere, and possibly indeed when at much greater, must consist of flame, or gaseous matter in an ignited or incandescent state, and undergoing combustion, but arising, as may be inferred from Sir H. Davy's re-
searches on flame, not from the combustion of matter which under ordinary circumstances can exist in a gaseous state at the surface of the earth, but from that of matter which is there solid, consisting, doubtless, of the metallic or other combustible bases on which it is composed. Among these it may be remarked are sulphur and phosphorus, both which Davy particularised as capable of combustion in air rared to a degree equal to that of the regions of the atmosphere in which meteors had been observed to display their tracks. The fact that with this concentration of matter upon this circumstance, as meteors contain other combustible bases which very probably have the same property, including the metal magnesium, an element of almost every meteor, it follows that in some cases the intense white light of the head or body and proximate portions of the tail, to the red light of the distant and extreme portions of the latter, being attributable to the cooling down of matter during its course, and in proportion to its distance from the most intensely heated part of the meteor.

It would appear, both from theory and observation, that the figure of the meteors must approach in their course that of an oblique cone, and that of the solid of least resistance. The meteorites which fall, or are cast down from them, when unbroken, especially those consisting of metallic iront, retain approximately the form which had thus been imparted to the meteorites of which they were the nuclei, by the resistance of the air—a form retained, in the case of the more perfect volcanic bombs, and which they have received from the same cause. These effects of the resistance of the atmosphere to the meteor's motion were first pointed out by Mr. Babbage.

The persistent track or trail of less vivid light often continuing to be seen for several minutes, or for a considerable fraction of an hour, or even for more than an hour, after the disappearance of the meteor itself, must be attributed to the deposition in the atmosphere, in the meteor's path, of a kind of beam of finely-divided solid matter,—mingled probably with vapour, and no doubt in part produced by the condensation of vapour,—resulting from the combustion proceeding in the meteor, and the particles of which, being originally deposited in the form of minute globules, were afterwards carried to preserve, during their slow and uniform descent in the tranquil regions of the air, where they originate, the aggregate form in which they were deposited; while the low conducting power for heat of the rare atmosphere permits them to retain their high temperature and consequent luminosity for a comparatively long period of time. The continued action of gravity, and the disturbing agency of currents in the lower regions of the atmosphere, will, however, eventually convert the at first rectilinear beam into a more or less curved and waved figure, and at length produce the serpent of fire of the superstitious ages, accurately reproduced in the case of the meteor of the 7th of January, 1856, as witnessed at Tunbridge Wells, and reported by a subscriber to the Royal Meteorological Society, on the 10th of March, 1856. These views are supported by reference to telescopic observations of the trails, particularly by those of the late Professor Piclet, of that left visible for seventy or eighty minutes by the meteor seen in France and Switzerland on the 15th of May, 1811, the most luminous part of which "did not appear to be continuous, but composed of distinct and separate particles."

The production, continued, general change of form and decomposition of these trails, may be familiarly, but correctly, illustrated by comparison with the similar succession of phenomena characterising the trail of smoke and soot issuing from the funnel of a steam-ship during its progress in its course; in which case the beam of smoke has been seen to be a line more or less curved separated from flame and smoke, and often several miles in length, becomes a persistent trail, and gradually changes into a waved or serpentine form. In many cases the trail of a meteor must have been originally a cylindrical beam, constituted as now explained, having a diameter of many hundred yards (equal to or greater than that of the meteor itself), and a length of many miles, deposited, in an inclined direction, at heights of some miles above the earth's surface. An objection founded on the assumed solidity of the particles, and the considerable specific gravity which must be attributed to them as results of the combustion going on within the meteors, which, it might be inferred, are inconsistent with the meteor's appearance; but this objection has once over by the experiments of Professor Stokes upon the effects of the internal friction of fluids (noticed in the concluding division of this article) applied to the common metal of the atmosphere, in a fluid of widely-different specific gravity, and to that of the suspension in the air of the minute globules of water constituting the cloud. The trails of meteors are suspended like the clouds, though, at first, probably, in higher regions of the atmosphere, and like them they consist of excessively minute particles, which, as in all probability their dimensions will be very nearly the same in all directions, may be regarded as spherules also, and will, consequently, be suspended temporarily, like the globules of smoke in the atmosphere, by the force of gravity from the adjacent air, as the result of the enormous arising from the internal friction of the air. The degree in which they partake of the projectile motion of the meteor itself, will also tend to their longer suspension, by converting the state of the meteor's considerable specific gravity would cause into an oblique curvilinear descent.

The two great causes of all the phenomena now described, are evidently the motion and the heat of the meteors. The origin of the former is doubtless involved in that of the production of matter in space, and the latter, in the constitution of the earth and its satellites, a subject noticed below. Dr. Chladni, the earliest philosophical investigator of the subject of meteors and meteorites (as a whole), and in later times Sir H. Davy and Sir John F. W. Herschel, have ascribed the heat to the compression and friction of the air, resulting from the enormous velocity of from six to thirty miles in a second, or more, of the meteors, supposed to be solid when they enter the atmosphere. Still more recently, in a paper read before the Royal Society on the 26th of June 1856, Dr. Johnson and Professor William Thomson have inferred from their own experiments on the thermal effects of fluids in motion, to which those of solids carried through fluids must be equivalent, the great probability that meteors really acquire all the heat they manifest from the friction of the air.

In the present state of chemical and meteorological science, it is unnecessary to enter upon the question of the origin of meteors and meteorites further than to urge, that, the computed enormous magnitude of the former,—the actual diameter of some exceeding that of the earth by many hundreds of miles, while in some instances its dimensions must probably be expressed in miles,—their planetary velocity,—and the pregnant fact that they give out a more intense light, and are visible for many minutes, than any of the known products of nature, and that the combinations of characters explicitly claimed by the writer of this article for the particular meteors from which meteorites have been observed to descend, as well as for many, if not all of those from which they are not known, must at once disprove nearly all the hypotheses which have been framed specifically to explain the origin of meteorites; and especially, among others, that of their projection from lunar volcanoes. The cogency of this argument will remain essentially unimpaired if it shall be found, according to recent suggestions, that the supposed enormous mass of meteoric matter is, in reality, far less than that hitherto ascribed to them. The problem of their origin must, in fact, be regarded as the same with that of the origin of the greater asteroids and planets themselves.

It is right to state that Mr. P. P. Miers, who has given much attention to the subject, is of opinion that there is a distinction between luminous meteors and those from which meteorites have fallen; an opinion which, so far as the (apparently) smaller meteors, called shooting-stars, are con-
cerned, he shares with the American Professor Olmsted, and others. Mr. Greg is the author of a valuable essay on meteorites, entitled, 'Observations on Meteorites or Aéro-

lites, considered Geographically, Statistically, and Cosmically; accom-panied by the Catalogue of meteoric falls.' It was first published in the 'Philosophical Magazine' for November and December, 1854, and in a separate form in November of the following year.

Globules of sand, and other deposits which have been enunciated in this article, have resulted from long attention to it by the writer. Others will be found, together with an invaluable assemblage of facts, in Arago's 'Astronomie Populaire,' liv. xxvi., 'Mémoires Comptes,' tome iv. p. 181—392; and also in the reports on meteorites annually issued for the years past to the Reports of the British Association, by Professor the Rev. Baden Powell.

The last recorded fall of meteorites appears to have taken place in 1857, on the 28th of February, when two large stones fell at Parnall, in the Madura district, Madras, as related by the Rev. H. S. Taylor, in a communication to the Asiatic Society of Bengal.

The purely physical history of the subject having now been generally considered, we may proceed to notice the manner in which the extraordinary relations produced in former times, of the appearance in the sky of blazing torches, sceptres, bundles of rods, fiery swords, trumpets, and other objects, may be represented in a more rationally known type of meteoric phenomena. This subject belongs to a field in the history of science and literature, hitherto but little cultivated. It may be elucidated by examining the figures and accounts of such appearances which are given in the works of old writers, especially of the most eminent and learned authors of ancient times, and of the present, and also by Ambrose Parey, and comparing them with similar phenomena as witnessed in more modern times, and depicted by observers whose only object was to represent the actual constitution of the luminous appar-

ances. The circumstance that from the enormous rapidity of the meteor, all the visible phenomena (except the persistent train) would have been seen and have ceased to appear within the limits of a few seconds of time (so that in all cases the figures have been produced from the mere eyes alone), which must have led to the representation of many appearances as simultaneous that in reality occurred in suc-

cession, and the manner in which during the transit of the meteor, impressions on the retina of past phenomena must have been mingled with those actually present, have led to the production of many of the singular representations that are extant. It would not be difficult to trace the mental pro-

cess by which natural objects, thus witnessed for a few seconds, may be confounded and prepared for by the mind, and prepared for by the mind, and for, we may even be eluded by reference to the great meteor of 1788, which ex-

changed the ringed sceptre of the medieval figures, the rings on the shaft being manifestly the smaller meteors, the production of which is the first visible result of the explo-

sion, seen as projected upon the tail of the parent meteor; other either, as is evidently the fact in many instances, the appearance of the train in the case of the meteors can be accounted for on account of the blinding upon the retina of the observer of past and actual appearances. The fiery sword dipped in blood is the meteor in its normal form, at the middle of its visible course, the distinct part of the tail shining with red light, being cooled down to the temperature of simple igni-

tion, as already indicated. In a similar manner, the bull's head, flying-eagles, and other monstrous appearances may be consistently explained, care being taken, when the authorities peremptorily assert the phenomenon, to be convinced of the fact by the evidence of the eye.

Clouds. The most recent view of this subject, apparently only one simple, but which really involves a variety of physical principles, is that of Sir John F. W. Herschel, stated in the following terms (Encyc. Brit. Ed. 8, vol. xiv. p. 626):

"When the sun shines on a cloud, which absorbs its heat, the cloud itself is necessarily partially evaporated, and the vapour by its levity tends to produce an upward current, and thus to counteract the effect of gravity. The globules of which it consists. A globule of water 1-4000ths in. in diameter, in air of five-sixths of the density on the surface, or at the height of about 6000 feet, would have its gravity nearly equal to its buoyancy; and the vapour which has been prepared for by thought. be served of cloud during the night. It is more than probable, however, that, when not actually raining, cloud is almost in process of generation from below, and dissolution from above, and that the moment this process ceases, rain, in the form of 'flurries,' commences. In a word, a cloud in general would seem to be merely the visible form of an aerial space in which certain processes are at the moment in equilibri,

um and all the particles in a state of upward movement.

To this, influence must be required but an adequate estimate of the effects of the 'fric-

tion' and the 'drag,' which are supposed not to exist. But it appears to have escaped the attention of Sir J. Herschel, that Professor Stokes had already shown that the internal friction of the air, together with the 'drag' which it occasions, is itself one of the causes— in his opinion, indeed, the main cause,—of the suspension of the clouds. As this particular subject is new, and (as we have seen in the previous division of this article, with respect to the force of gravity) of great importance in meteorology, we shall treat it at some comparative length.

Clouds consist of an aggregation of separate minute globules of water; and the resistance to such a globe would be extremely great with its surface almost wholly on the cause just stated. "Since the index of friction of air is known from pendulum experiments, we may," Professor Stokes observes, "easily calculate the terminal velocity of a globule of given size, neglecting
the part of the resistance which depends upon the square of the velocity. The terminal velocity thus obtained is so small in the case of small globules, such as those of which we have been speaking, that even if, as is generally believed, suspension of the clouds does not seem to present any difficulty. Since in the case of minute globules falling with their terminal velocity the part of the resistance depending upon the square of the velocity is quite inconsiderable compared with that part which depends on the internal friction of the air, it follows that the pressure equal in all directions in air in the state of motion [which according to the common theory of hydrodynamics, it would be], the quantity of water which would remain suspended in the state of cloud would be enormously diminished.

To render this view of the subject complete, and to explain the value of the last observation, it must here be stated that Professor Stokes had before shown that the fundamental assumption of hydrostatics and hydrodynamics, that the pressure of a fluid is equal in all directions, though fully justified by experiment in the case of a fluid at rest, is not true in the case of a fluid in motion. The viscosity attributed to water by DuBois, and the inherent property "analogous to that of viscosity in liquids," ascribed to elastic fluids by Capt. (now Major-General) Sabine, from their respective positions, Dr. Jones上下文中的独立性是不正确的。Professor Stokes has demonstrated that the resistance of the fluid, whether liquid or gasous, is proportional, not to the surface, but to the radius of the sphere, and consequently the quotient of the resistance divided by the mass,—in other words, the accelerating force of the air—will be in a higher power of the radius than must diminishes, than if the resistance varied as the surface: on which principle the suspension, or proximate suspension, of the particles or globules depends. When the downward motion of a globule is so slow, that the part of the resistance which depends on the square of the velocity may be neglected, the terminal velocity of a globule of water forming part of a cloud may be determined. For a globule the one-thousandth of an inch in diameter, we have the velocity 1:933 inch per second. When the same area at the opposite end of an inch in diameter, the terminal velocity would be a hundred times smaller, so as not to amount to the one-sixtieth part of an inch per second.

The amount of that part of the resistance which varies as the cube of the velocity, and which is the only kind of resistance that could exist if the pressure were equal in all directions, for the velocity 1-933 inch per second, is not quite the one hundredth part of the weight; and for a sphere only the one ten thousandth of an inch in diameter, the ratio of the resistance to the weight would be ten times as small. Both these proportions, it is manifest, are quite insignificant.

The conclusion thus arrived at by Professor Stokes as to the cause of the suspension of the clouds, illustrates in a remarkable manner the connection of different branches of science. It is an application by him of the theory of internal friction, as applied to the ball pendulum, and verified by recorded experiment, and at the same time a continuation of his memoir 'On the Effects of the Internal Friction of Fluids on the Motion of Pendulums,' published in the Transactions of the Cambridge Philosophical Society,' vol. ix. The erroneous extension of the fundamental law of hydrostatics has been discussed by him in a paper 'On some Cases of Fluid Motion' inserted in the preceding volume of that work.
schools of the Oratory in his native city. Father Respighi, a priest of that congregation, observed the remarkable talents of the boy, and saved him for literature. He was removed to a higher school—one of the so-called 'Scuole Pic' of Bologna—and eventually to the archiepiscopal seminary, where, after completing the usual course of letters, philosophy, divinity, and canon law in the university, he was admitted to priest's orders in September 1797. Of the details of his progress in the study of languages during these early years no accurate record is preserved; but it is known that he acquired the principal modern languages, Greek, Latin, Spanish, French, German, and Swedish languages. In September 1775, at the early age of twenty-two, he was appointed Professor of Arabic in the university, and commenced his labors in the December of that year; but he did not long enjoy what would have been a most congenial office. On the annexation of Bologna, as one of the papal legations, to the newly established Cisalpine Republic, he refused to take the oath of the new constitution, and was set aside from the exercising of his functions. The conflict between Pius VII. and the first consol, the ancient constitution of the university was restored. In 1803 Mezzofanti was named to the higher-professorship of Oriental Languages, and became assistant librarian of the public library of the city. The study of Oriental Languages, however, being suppressed in 1806, Mezzofanti was for some years reduced to great distress, and became dependent for his own maintenance, and that of the orphan family of his street, mainly upon the casual income derived from private tuition. The elder brother of the late Archdeacon Hare is said to have been one of his pupils, and a living English cousin received lessons in English from him at a later period.

But for Mezzofanti steadily followed in private what had become his engaging pursuit—the study of languages. A letter of his, dated in 1804, to the celebrated Orientalist John Bernardo de Rossa, whose personal acquaint- ance of his situation, during his residence in Rome in 1806, inclosed a composition in twelve languages, which he submitted for the judgment of his correspondent; and before 1812 his reputation as a linguist had become thoroughly established. The well-known Pietro Giordani, in several of his letters to his friends, calls him "the divine Mezzofanti," and declares that his skill in living and dead languages entitles him to be regarded as "a man of all ages and all nations." The war of which Northern Italy was so long the field had afforded and Mezzofanti many opportunities of extending his stock of languages. He was attached to the Legation of Bologna, to which he was attached as volunteer chaplain, to be met—among the invalids of the Austrian, Russian, and French armies—Germans, Hungarians, Bohemians, Welsh, Spaniards, Poles, and Poles. In the desire to offer these sufferers the consolations of religion, partly from his love of the study itself, Mezzofanti laboured assiduously to turn these and all similar opportunities to account; and several instances are recorded in which, without the assistance of a grammar or dictionary, he contrived to establish a mode of communication with a stranger who was utterly ignorant of every language except his own, and eventually to master that language sufficiently for all the purposes of conversation. He has kept an account of this mode of study during these years, which is not a little curious and interesting. "The hotel-keepers," he says, "were in the habit of notifying to me the arrival of all strangers at Bologna; and I never hesitated, when anything was to be learnt thereby, to call upon them, to interrogate them, to make notes of their communications, and to take lessons in the pronunciation of their several languages. There were a few learned Jesuits too, and several Spaniards, Portuguese, and Frenchmen, from whom I received valuable assistance, both in their own and in the learned languages. I made it a rule to learn every strange grammar, and to apply myself to every new dictionary that came within my reach. I was constantly filling my head with languages, each to a very low degree, passed through Bologna, I tried to turn the visit to account, either for the purpose of perfecting my pronunciation, or of learning the familiar words and turns of expression. Nor did all this cost me so much trouble; for, in addition to an excellent memory, God had gifted me with remarkable facility of the organs of speech."

In the year 1815 Mezzofanti was appointed assistant librarian of the university; in 1816 he was reinstated in his professorship; and in 1817, he was made a canon. From this period, especially after the peace, his reputation rapidly extended. Every visitor of Bologna related fresh marvels regarding his prodigious attainments. Tourists from every nation, whether of Europe or of the East, united in representations of the knowledge of the learned man. St. Stewart Rose, in 1817, reported him as reading twenty languages, and speaking eighteen. Baron Zach, in 1820, set down the number at thirty-two. Lord Byron, about the same time, pronounced him "a walking polyglot, a master of thirty languages," and the Lady Morgan saw him, in 1821, common report described him as speaking no less than forty languages; but when she inquired from himself the truth of the report, he replied that he had only gone over the outlines of that number. M. Molbech, a Danish traveller of the year 1820, reports the number of his languages at "more than thirty," and testifies to his speaking Danish "with almost entire correctness." French, German, Spanish, Polish, Russian, Greek, and Arabic, are the languages most commonly spoken by Mezzofanti with regard to their own, but also to many other languages.

During all these years—except a short visit to Pisa, Leghorn, Florence, and Rome—he had resided altogether in Bologna, though invited to some of his friends to travel in Europe. From Paris to Vienna, and from Vienna to Rome. At length, having come to Rome, as a member of the delegation sent by the Bolognese to offer their submission to the pope, Gregory XVI., after the revolution in 1821, he was induced by the pope to settle permanently in Rome, and to accept a prebend in the church of St. Mary Major, which was soon after exchanged for a canonry in St. Peter's; and, on the promotion of the celebrated Angelo Mai, then keeper of the Vatican Library, to the secretariatship of the Propaganda, he was appointed in the important charge of the Vatican. He held this office till 1838, in which year, conjointly with Mai, he was elevated to the cardinalate.

Mezzofanti's residence in a great centre of languages, such as Rome, and especially the facilities of intercourse with the various races represented in the college of the Propaganda, gave a new impulse to Mezzofanti's linguistic studies. The reports of his visitors at Rome are still more marvellous than those of the Bolognese period. An eminent German scholar, Herr Guido Görres, who had much intercourse with him in the year 1841, writes thus: "He is familiar with all the European languages; and by this I understand not only the ancient and modern languages of the second class, such as the Greek and Latin, or the Italian, French, German, Spanish, Portuguese, and English—his knowledge extends also to the languages of the second class, viz., the Dutch, Danish, and Swedish—to the languages of the third class, such as the Slavonic—Russian, and Norwegian, as well as the Hebrew, the Arabic, the Syriac, the Samaritan, the Chaldean, the Sabae—I may even add, with the Chinese, which he does not only read, but speaks. Among the Hamitic languages, he knows Coptic, Biblical, Abyssinian, Amharic, and Anglesian."

What is especially remarkable is the facility with which the learned man was gifted by Mezzofanti is, that his knowledge of each among this vast variety of languages was almost as perfect as though his attention had been devoted to that language exclusively. The method of pronunciation, of course, was his great study, and the language faculty in describing him as speaking in each language thus with the precision, and in most cases with the facility of a native. His pronunciation, his idiom, his vocabulary, were alike unexceptionable. Even the familiar words of every day language were at his command; and in each language he was master of all the leading dialects, and even of the provincial peculiarities of idiom, of pronunciation, or expression, in
French, he was equally at home in the pure Parish of the Faubourg-St.-Germain or in the Provençal of Toulouse. He was a fluent and agreeable conversationalist, master of the Black Forest, or to the classic vocabulary of Dorothea; and he often amused his English visitors by specimens of the provincialisms of Yorkshire, Lancashire, or Somersetshire. With the literature of these various countries too he was well acquainted. He knew the great authors in their respective languages; and his remarks are described as invariably sound and judicious, and exhibiting careful and various reading, often extending to departments with which it would never be supposed that a foreigner could be familiar. A Dutch traveller, for instance, Dr. Wap, was surprised to find him well acquainted with his own national poets, Vondel and Cats; a Dane, with the philological works of Bask; a Swede, with the poetry of Olof Hjelm; a Greek, with the characteristics of the poetry of Me?l; and an English gentleman was astounded to hear him discuss and criticize Hudibras, of all English writers the least attractive as well as the least intelligible to a foreigner. He was in the habit too of amusing himself by metrical compositions in the various languages which he cultivated, and often wrote for his visitors a couplet or two in their native language as a little momento of their interview. Dr. Wap, the Dutch traveller just referred to, speaks in his diary of having been entertained thus by Mezzofanti replied to a sonnet which Dr. Wap had addressed to him; and the well-known Orientalist, Dr. Tholuck, having asked Mezzofanti some memorial of his visit, received from him a Persian couplet after the manner of Hafiz, which he was (although not without some delay) during Dr. Tholuck's visit.

After his removal to Rome, although he had already passed his fiftieth year, he added largely to his stock of languages. His most notable acquisition during this period was the Spanish, which he acquired (partly at the Chinese College in Naples, partly among the Chinese students of the Propaganda) in such perfection as to be able not only to write and converse freely in it, but even to preach to the young Chinese ecclesiastics. During the same period he acquired the Armenian, the California, some of the North American Indian languages, and even the "impossible" Basque. And it was in Rome, and especially in the Propaganda, that he displayed in its greatest perfection his singular power of instantaneously passing in conversation from one language to another, without the slightest mixture or confusion, whether of words or of pronunciation.

Mezzofanti, as cardinal, was a member of many ecclesiastical assemblies in the last part of his lifetime, and it is difficult to determine with accuracy the number of languages in which he held conversation. It is certain that the number of these was very large, and that he was among the greatest living linguists of his time. During his lifetime, as well as after his death, he wrote many papers in various languages, and translated works from one language to another, and his knowledge of languages was so extensive that it is difficult to institute any direct inquiry; but, judging from analogy, and relying on the well-known modesty and truthfulness of Mezzofanti, we need not hesitate to accept his own statement as reported by P. Crescenti, the more so, as among his papers now in the possession of his family is a list, drawn up from memoranda contained therein, of no less than a hundred and twenty languages with which he possessed some acquaintance, unaccompanied however by any attempt on his part to give the number which he spoke, or the degree of his knowledge of each.

In general learning Mezzofanti's attainments were highly respectable. He was a well-informed theologian and canonist, and an impressive though not eloquent preacher. M. Libri, the historian of mathematical science in Italy, found him well acquainted with algebra, and reports an interesting conversation which he had with him on the Bija Gannita (the algebra of the Hindus), as well as on the general subject of Indian history and antiquities. Other travellers among the orientalists of the time have described him as entering freely into the history as well as the literature of their several countries. But as an author he is almost unknown. He occasionally read papers at various literary and scientific societies in Bologna and Rome; but this was the only knowledge which he communicated to his friend and brother professor, Father Emmanuel Apeote, which was printed at Bologna in 1620; and he leaves no monument for posterity beyond the tradition that he was incomparably the greatest linguist the world has ever seen.

MICA, a Mineral belonging to the extensive series of Silicates of Alumina. It occurs in oblique rhombic prisms of about 190° and 60°. The crystals usually with the acute edge replaced. The cleavage is very decided, yielding easily thin, flexible laminae. It is found usually in thinly foliated masses, plates, or radiated groups of aggregated scales or small folia. The colour is from white, through green, yellowish, and brownish shades to black. The lustre is more or less pearly. Transparant or transparent. The hardness 2 to 2½. Specific gravity 2.8 to 3.0.

The composition of micas is as follows:

- Silica
- Alumina: 46.3
- Potash: 36.8
- Phosphates of iron: 9.2
- Fluoric Acid: 8.5
- Water: 0.7

A variety in which the scales are arranged in a planar form is called Plumeose Mica; another in which the plates have a transverse cleavage, has been termed Prismatic Mica. Micas resemble externally talc, and some forms of gypsum. From talc it differs in affording thinner laminae, and being elastic. It also has not the greasy feel of talc. The same characters except the last distinguish it from gypsum, besides which it does not differ.

Mica is one of the constituents of granite, gneiss, and mica-slate, and gives to the latter its laminated structure. It also occurs in granular felsitones. It is found abundantly in the United States, in Russia, in Great Britain, and other parts of the world. It is often found in large isolated masses, but filling up the veins and fissures of rocks, into the composition of which it enters. It occurs in the oldest rocks, as well as in these which are new and possess a crystalline character.

In Russia it is used extensively as a substitute for glass, and hence it is called Nacorry Glass. The very thin laminae are employed for examining objects under the microscope. Haüy states that these laminae are sometimes not more than the 1-300,000th part of an inch in thickness. Lepidolite, or Lithia Mica, occurs in crystals or laminae of a purplish colour, and often in masses consisting of aggregating scales. It occurs in the Ural. According to Reauleau, as quoted by Dana, it consists of the following analysis:

- Silica: 47.7
- Alumina: 20.3
- Lithia: 6.3
- Protoside of Manganese: 4.7
- Potash: 11.0
- Lithia: 2.8
- Soda: 2.3
- Fluorine: 10.2
- Chlorine: 1.3
- Other: 106.3

Fusculite is a green Mica from the Zilleralp, containing nearly 4 per cent. of oxide of chromism.

Lepidolite Mica is the most common. The two species have been made out of the old species so called. The common Mica has an oblique prism for its primary, but many micas when

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Note: The text continues with the analysis of various minerals and their properties, likely discussing their uses and characteristics in detail.
396 is very Dziady, prisoner Polish there, still Dziady, another, again merit, every 'Graiyna' Byron, It addressed university when from of ania so certainly ever leaves. These perfect MICKIEWICZ, Ottrelite deeply afterwards, to English first after finishing by ancient. Mickiewicz made that of Wilna. They found in Pennsylvania, United States.

Nacrie resembles tale, but contains no magnesia. It is whitish and soft, and has a greasy feel. Lepidolitane is a black iron mica, occurring in 6-sided scales or tables aggregated together. Celarite is a mica occurring in black scales. Oderit is probably a black mica. It can be split into thin leaves. It is opaque, black, and has very little lustre.

It occurs in Sweden. MICKIEWICZ, ADAM, the greatest poet that Poland has ever produced, was born in the year 1795 at Nowogrodek, a small town in Lithuania, one of the few in the environs of which the ancient Lithuanian language is still spoken. It is certainly remarkable that a man, the chief effort of whose life was to prevent the language, the nationality, and the religion of his country from being lost, should be the native of a country which had lost its language, its nationality, and its religion by its union with Poland. His father, by birth a noble, was by profession an advocate, and an unsuccessful one, his brother afterwards became a legal writer of some reputation. Mickiewicz himself had so little respect for the nobility of his family, that in his poem of 'Pan Tadeusz,' in which the scene is laid in Lithuania in the year 1018, he introduces his family name as that of a commoner and illiterate brazier in a pothouse. It is singular that Pushkin, who acquired the name of the Russian Byron as Mickiewicz did that of the Polish Byron, takes occasion in his play of 'Boris Godunov,' to introduce one of his own ancestors in an odious and contemptible light. The feeling of the two poets in the respect was very different from that of their English prototype.

Mickiewicz after receiving his preliminary education at Nowogrodek and the grammar-school of Minsk, was sent when nineteen years of age to the University of St. Petersburg, his uncle, an ex-Jeniat, was one of the professors. The university under the anepiscopes of Sniadecki the mathematician, and the patronage of Prince Czartoryski, then Minister of Public Instruction, was at that time in the full tide of prosperity, and learning and knowledge of the population of Russian Poland, and celebrated for the success with which the exact and natural sciences were taught. Almost the first person whom Mickiewicz saw at Wilna was Thomas Zan, a celebrated Polish patriot, who was occupied with getting up secret societies among the students, of which Mickiewicz at once became a member. The professor of history, Lelewel, was another determined opponent of the Russian government, and to him Mickiewicz addressed his publication under the title of 'Blindness,' and fell deeply in love with the sister of a fellow student, Maria Wereszczakowa, by whom his addresses were finally rejected for those of a richer author. When he left the university, where he had been noted for his devotion to chemistry and afterwards to poetry, he was appointed professor of classical literature in a college at Kowno, and it was while residing there in 1822 that two small volumes of poems from his pen were published at Wilna. Like those of Burns and Byron, they were made at various degrees of merit, some of them spirited, others pleasing, and others again poor and commonplace. But two poems of the set, 'Grajyna,' and 'Dziedy,' are of a very high class. In 'Grajyna,' in which the poet takes for his scene the old castle of Nowogrodek, the ruins of which are still remaining near his native town, he tells in a tersely classical and sculptural style, which reminds the reader of the happiest effusions of Tennyson, the story of a Lithuanian heroine, who, to save her country from the hands of oppressors, marries her own brother, and meets death on the field of battle. It became the favourite poem of a real Lithuanian heroine, Emilia Plate, who eight years afterwards fought in the Polish ranks in the inscription of the battle of Kraszew near Wilna. The 'Dziedy,' or 'Ancestors,' is a poem of a new kind, an autobiographical drama, in which the poet appears as one of his own characters. In it the poet relates, with this slight veil, the story of his love for Maria, the 'Mary Chaword' of his poem of 'Dziady,' who afterwards married the Prince in Byron's style. Afterwards rendered into Polish, it would be difficult to find a love-tale more tenderly and delicately told. The name of Mickiewicz became at once popular among his countrymen. A valley near Kowno, which he was fond of visiting, and where he wrote some of his verses, received the name, which it still retains, of 'Mickiewicz's Valley.' The enthusiasm of the Poles was heightened by the next intelligence that spread far and wide concerning him, that he was an exile. The hands of the Russian government and suspicion of being concerned in the secret societies which had been found to exist in the University of Wilna. The dedication of the 'Poems,' containing 'Dziedy,' had been to Thomas Zan and a few friends, and probably the poet little anticipated that it should attract so much attention which was the part of the 'Dziedy,' published after long years of interval—"To the sacred memory of John Sobolewski, of Cyprian Daskiewicz, of Felix Kolakowski, my fellow-students, my fellow-prisoners, my fellow-exiles, persecuted for the honour of our religion and our country, whose valiant and noble souls are laid by the side of the small valleys in which their hearts died at Archangel, at Moscow, at St. Petersburg, in the march of their country's cause." Imprisoned for upwards of a year in the Bastilian convent at Wilna, while the examination to save the honour of his homeland and the cause of Russian education were directed, and those which were afterwards delineated with all the force of his genius, Mickiewicz, found guilty of being a member of two secret societies, was condemned, in 1824, to perpetual banishment in the interior of Russia. At the age of twenty-six, Mickiewicz left Poland for exile, and he never saw it again.

At St. Petersburg, where he was at first permitted to reside, Mickiewicz found himself, in the latter years of the Emperor Alexander, in the midst of native conspirators against the government, and in the service of the Russian government, active in the abortive insurrection at the accession of the Emperor Nicholas, were ardent for the Polish cause. In a poem "to his Russian friends," written in after years, Mickiewicz men- tioned that he was sent to Wilna, with a commission to put a car, and alludes apparently to Pushkin, to whom they intro- duced him, as having deserted the cause of liberty. The Russian Byron and the Polish Byron met at St. Petersburg in the year of the death of the English Byron. Po- litical disjunction was not looked upon with favour by those eyes by the Russian government, which ordered Mickiewicz to Odessa; there, however, he soon obtained permission for a tour in the Crimea, which gave rise to a series of 'Crimean Sonnets,' the first sonnets in the Polish language. This subject now gives them an additional interest. One of them is "On the View of the Mountains from Kozlov, or Barta- toria; another, 'On the ruined Castle of Balaklava." These poems have been very popular; and one of them, 'On the ruined Castle of Balaklava,' has been translated into Russian, and afterwards translated into Persian; but we believe that from no other poems of Mickiewicz could so many instances of false brilliancy and other common-place be selected. They obtained for him an invitation from the governor, Prince Golitsin, and afterwards to live among them in detail; it incites the most burning hatred on the part of a cruel nation to its foreign oppressors. Its meaning, which was at once apprehended by every Pole, seems to have escaped
every Russian. Two Russian translations were published, and it is even said that the Emperor Nicholas sent a message to the first one of the Polish government, that the Russian service was also, it is said, preferred to him; but the only favour he asked was to be allowed to visit Italy for the benefit of his health, and he obtained it by the intercession of the Russian poet Zhirzhevsky. He left Russia, as he had promised in 1837, but he returned in 1838 to his life of complete solitude.

After passing through Germany, where he spent some days with Goethe, he resided at Rome, where he became intimate with James Fenimore Cooper. It was at Rome that the news of the Polish insurrection of 1830 reached him, an insurrection which he had for some time been awaiting; and it was there that he composed his great and immortal ode 'Ode to Youth.' The rising was crushed by the time Mickiewicz had reached Posen on his way to join it. He returned to Dresden, and there composed the second part of the 'Dzidzery,' which was first published in 1832 at Paris.

As in the former part of this poem Mickiewicz had told in a dramatic form the tale of his early love, in this he related in a succession of scenes the story of his imprisonment in Wilna before the sentence of banishment. As a lover, he represented himself as having been driven by disappointment to insanity; as a man, he actually delineated himself as possessed by the devil, and the devil as exorcised out of his body by a priest, after the atonement of a proud and presumptuous savage, whom the poet represents as having called down the chastisement. This strange and repulsive scene is accompanied by others of a less eccentric character, in which the poet's friends and followers are represented as rescuing him from the horrors of the Russian sway in Poland are depicted with surprising power and pathos. On the whole, this wild production is one of the most remarkable for poetical power that the literature of the quarter of a century since 1830 has produced.

The last great poet of Mickiewicz's, 'Pan Tadeusz,' or 'Sir Thaddeus,' was published in Paris in 1834. It differs as entirely in style and sentiment from the 'Dzidzery' as 'Waverley' from 'Manfred.' It is a minute delineation of the last of the great epoches of Poland, of the poet's boyhood, in which the somewhat insignificant story of a commonplace here is relieved against the dark background of the approach of Napoleon's invading army on its march to Russia, and the intense excitement it produces amongst the Lithuanians, from the peasant and the publican to the priest and the noble. By some it is regarded as totally unworthy of the powers of Mickiewicz—by many as the finest production of his genius; and there can be no doubt that he is by far the most pleasing and the least objectionable.

Up to this period the career of Mickiewicz had been one to which his Polish admirers had looked with constantly increasing admiration, and he occupied a position in the literature of the world similar to that of the French poet's boyhood, in which the somewhat insignificant story of a commonplace here is relieved against the dark background of the approach of Napoleon's invading army on its march to Russia, and the intense excitement it produces amongst the Lithuanians, from the peasant and the publican to the priest and the noble. By some it is regarded as totally unworthy of the powers of Mickiewicz—by many as the finest production of his genius; and there can be no doubt that he is by far the most pleasing and the least objectionable.

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Since his and any Mooches minute whilst he person must, remarkable passage he delineates his young hero in the palace of his foe as descending to the meanest spite—

I secretly sharpened my knife, and with what a rapture of vengeance I cut the carpets of Wijnroch, and raised his glittering mirrors.

It is said that at the time of the appearance of this passage in the works of Mickiewicz, and the publication of the first volume of the Dunia, or the daily national paper, Count Constantine at Warsaw carried out the idea. The gross anachronism of the carpets and the mirrors in a story of the 14th century is only one of many which abound in the works of Mickiewicz, and it is not to rely on such evidence. Yet, the question is, whether his views and theories were concerned. He tells us, for instance, in one of his Napoleonic legends that the genius of Byron was undoubtedly kindled by a ray from that of Napoleon, and that Byron would have been an almost perfect copy of the conqueror. So decrepid and almost dead as that of England, which had as it were come to a close with Thomson and his followers. This general inaccuracy and untrustworthiness must, in fairness to the Russians, be remembered by the readers of the thrilling delineations of their cruelty which abound in the 'Drizady.' Whatever may be the judgment pronounced on Mickiewicz as a writer, a politician, and an historian, nothing can ever erase from Polish literature the mark of his genius as a poet.

MICROSCOPES, USES OF THE. There are few instruments that have rendered such important aid in scientific search as the Microscope. The chief advances that have been made in the natural history sciences, embracing physics, chemistry, botany, zoology, and other sciences, in the 19th century, have been effected by its agency. The structure of this instrument has been described in the article Microscope. It has been gradually rendered more perfect as the science of optics advanced; and its nature and arrangement can only be understood by the study of the principles of this science. We propose here referring to its use as an instrument of natural history and physiological research, and of those general arrangements and applications by which its utility can at all be fully secured. It is at once sufficient that a man possesses eyes in order to observe accurately, nor is it the possession of a costly microscope that will enable a person to confirm the observations of others or make discoveries of his own. The use of the microscope by uninstructed and uncurious observers has given rise to many absurd errors. "The fruit of the mulberry has been mistaken for Rhusococcus; calcareous corpuscles have been regarded by several observers as ova, and the appearance arising from the presence of concentric laminae has been interpreted to be the cells of an object fully developed. In my own experience, I have seen the animalcules in the mouth of a lizard; minute corpuscles in blood; minute spicules in chalk and coral; minute hairs projecting on the surface of a membrane have been declared to be spicules within subjacent cells; and quite recently one writer states, that certain minute bodies which he has examined are either blood-corpuscles or the spores of fungi, but which is doubtful! while another recognizes, how, by accident, he discovered that corpuscles, which he had regarded at first as consisting of fat, were afterwards found accidentally to consist of calcareous salts!"

Again, we read in zoological works of the yolk-cells, and the coloured oil-globules of the yolk; and a beautiful function of assimilation has been attributed to them; but they exist only in the imagination of the authors, who have regarded the one as cells, simply because they are round, and the other as oil, because they are yellow. But the yolk-cells have also been regarded as mucus cells, and again as blood-corpuscles; minute fossils in chalk have been strung together with portions of vegetable tissue, and (perhaps) the spores of fungi; minute bodies resembling small hair-like spicules have been regarded as spicules; and minute bodies resembling the neucleolus have been described as spicules within subjacent cells; and quite recently one writer states, that certain minute bodies which he has examined are either blood-corpuscles or the spores of fungi, but which is doubtful! while another recognizes, how, by accident, he discovered that corpuscles, which he had regarded at first as consisting of fat, were afterwards found accidentally to consist of calcareous salts!"

In microscopic observation two things must be remembered: 1st, That the microscope is especially with high magnifying surfaces, not bodies. It frequently happens that in looking upon surfaces, we get a glance into the depths, of transparent objects by changing the adjustment, without altering the position of the object; it often happens however that, in looking upon opaque objects, we are unable to make them out to be bodies until we have changed their position, and ascertained their dimensions in three different directions; this, in many cases, from the nature of the object itself, in a mass of dead matter, such as a pellet of mica, or under the microscope in their natural condition; that we consequently must take into consideration the changes which we ourselves partly produce, either by the medium in which the object is placed, or by the use of the microscope itself, and that every thing we see through the microscope secures the observer from deceptions which arise, not from any fault in the instrument, but from a want of acquaintance with the microscope, and from a forgetfulness of the width of difference between common vision and vision through a microscope. Deceptions also arise from a want to distinguish between the natural appearance of the object under observation, and that which it assumes under the microscope.

The proper use of the microscope is always the principal thing to be considered. Hedwig, with the microscope of his time, accomplished the advancement of science to a greater extent than any observers with incomparably better instruments have done.

In order to use the microscope properly, the observer must be skilful in handling the instrument and the objects, and above all things, his mode of proceeding must be conducted with accuracy and judgment, and he must be able to give a sufficient reason for every thing that he does. His progress in research will be slow, but sure; he must endeavour to obtain objects from every possible source, and must examine them carefully and scrupulously, as well as possible, and so, progressing step by step, he will attain the desired end. Work without method will seldom lead to any result; the finest sections of wood made in a microscope, will not be of much use to the observer if they are not conducted in a proper manner, and well-prepared specimens of the successive conditions of the wood, furnish irrefragable proofs, the one of the construction, and the other of the development in the growth of the wood under observation. (Schacht on the Microscope.)

Before speaking of the methods of examining and preserving bodies for microscopic observation, it will be better to draw attention to the natural objects, to the examination of which the microscope is especially adapted. In the inorganic and organic worlds the microscope is made subservient to observation. To speak first of inorganic substances and materials not under the influence of vital action.—It has been found of great use in determining the forms of minute crystals. In this way it aids the analytical chemist. In the examination of the saline contents of water, if a small quantity of the water is allowed to evaporate upon an ordinary glass slide, its contents may be judged of by the crystals which the crystals are obtained from these bodies this plan of examination has been recently applied with the most interesting results. A series of the most beautiful illustrations of the microscopic characters exhibited by crystals obtained by the evaporation of sea water has been given by Prof. Funke's 'Atlas of Physiological Chemistry,' and also in the 'Micrographic Dictionary,' by Dr. Griffiths and Mr. Henfrey.
Not only are the natural crystalline constituents dissolved up in liquids thus obtained, but new combinations obtained by the addition of re-agents. This mode of inquiry is equally applied to the minute parts of the human body, and is rapidly becoming one of the most important means of diagnosis in the hands of the physician.

Although dealing with the disposition of large masses of matter, of which the earth’s surface is composed, important knowledge has been gained as to the existence of the various portions of them with the aid of the microscope. It is by the aid of this instrument alone that the question of the manner in which an extensive series of rocks has been deposited, and also the mineralogical and homogeneous surface, when sections are made of them and placed under the microscope, are found to consist of the remains of the minuteest forms of organic beings. [Diatomaesser, S. 2; Irresso.] When, on the other hand, rocks which, like the Oolite, present the appearance of being composed of various forms of organic beings, on close examination with the microscope are found to present appearances due to purely physical causes. Each of the little egg-like beads seen in these rocks is found to contain a particle of sand surrounded by carbonato of lime. [Oolite, S. 2.] It frequently happens that the fossilised parts of the higher animals which are left in the solid rock are too small or shapeless to indicate the characters of the forms of which they were composed, but by the microscope this question can be determined in multitudes of instances. It has been found by the recent researches of Dr. Carpenter and others, that the microscopic characters afforded by the structure of shells are frequently so distinct as to enable even the most untrained observers to distinguish them. [Mollusca.] This is a subject of the highest interest to the geologist; for of all the remains of animal life those of the Mollusca, from the hard nature of their shells, are those which are furnished to him in greatest abundance for distinguishing the character of different strata, and determining their relative age. Amongst the vertebrate animals, next to the teeth, the bones are the parts which are most frequently left in rocks. When the form of the bone is no guide, its microscopic structure, whether it is compact or spongy, with which it belongs. The forms presented by the lacune, or bone-cells, which are only visible by the aid of the microscope, are found to differ so much in fish, reptiles, birds, and mammals, as to afford the means of distinguishing each class. The teeth are only modified bone, and although they present most frequently a very definite external form, and are usually better preserved than any other part of an animal body, they afford still more definite characters by the modifications of the space that is occupied by the blood-vessels, and the internal structure of the tooth presents a better character than any other part of its structure in the gigantic extinct frog, the Lozzerinodon.

Among the earlier fishes which inhabited the seas of the earth, and which bore no resemblance to those which have a cartilagenous skeleto; but with this perishable skeleton they were endowed with hard scales, which have resisted all decomposing agencies, and these scales, frequently scattered, are the only record of their existence. From microscopic examination of the structure of these scales, Professor Williamson has shown that the species of those fishes can be detected.

Numerous are the forms of Zoophytes, Polypora, and Echinodermata that have left remains in the strata of the earth which the naked eye can by no means distinguish, but whose differences are immediately revealed when sections of their fossilised remains are placed under the microscope. Examples that will be found in the second volume of Professor Quatrefyett’s ‘Dictionary.’

We pass from this glance at the use of the microscope to the chemist and geologist, to point out its value in researches connected with living organised beings. We begin with plants. It is in the vegetable structure that the ultimate cells, of which all organised beings are composed, are most easily discerned. The earliest microscopic observers were aware of this. It was left however for Schleiden to perceive the full significance of this fact in 1838, when he drew attention to the fact that a single cell is the elementary unit of the cell. [Cida, S. 2.] He was followed by Schwann, who pointed out that the cell was of equal importance in the animal as the vegetable kingdom. The ultimate cell of the plant or animal is only visible to the aid of the microscope; hence whatever importance is attached to the discovery of cells and the formation of tissues by their agency is due to the use of the science of microscopy.

The incessant labours of microscopic observers during the last century have enabled us to determine the nature of the vegetable kingdom, to distinguish minute animals and plants, inhabiting more especially water, and which are perfectly invisible to the naked eye. The earliest observations on these minute beings were made by Leewenhoek; but for these we are indebted to both Quekett’s and Lant’s. [Oolite, S. 2; Irresso.] Since the publication of the latter, observers have been enabled to distinguish a large number of genera and species, and consequently to form the idea that the microcosm is a source of increasing interest to microscopic observers. Representing the entire animal or plant in its simplest form, the observations of their growth, structure, and functions have thrown light on some of the most complicated problems of animal and vegetable physiology. Small as they are, they make up for want of size by the prodigious numbers in which they occur, and the important functions they seem to perform in the universe. The unveiling of this world of life is therefore deeply important.

It is not however alone in revealing the minute structure of plants and animals, as the existence of organic beings of minute size, that the naturalist and physiologist are indebted to the microscope. By its aid they have been enabled to investigate the fundamental laws of organicography, and to verify the facts that plants and animals are built up of cells it was a natural inference that these cells performed an important part in the functions of these tissues. It was soon found that the animal and plant increased in size by the multiplication of these cells; that the tissues were renewed by their agency; that the function of secretion was performed by them; in short, that it was by the aggregate of their functions that plants and animals lived. Hence the cell theory, or cell organisation of the universe, the definition of which living beings what the law of gravitation was to the phenomena of the physical universe. Till the application of the microscope the mysterious function by which new beings in plants and animals were produced was only imperfectly apprehended; but since its extended employment the laws which regulate this process have become perfectly obvious, and but little remains to complete our knowledge of the subject. [Reproduction in Plants and Animals, S. 2.]

Having thus traced in outline the uses of the microscope, we now proceed to give some general directions for examining them. In giving these directions we shall follow Dr. Schacht, whose work on the microscope has been translated into English by Mr. Currey.

One of the principal advantages for microscopic investigation, besides a good instrument, is a proper supply of light. When the position and nature of the apartment can be selected at pleasure, a room should be chosen having windows facing the west or the north, or, what is better, a room with windows towards both those quarters of the heavens. The windows must be as high as possible, since the light received from the horizon is the most favourable; light reflected from a white wall, or the light of white clouds, is often very advantageous. The light of sending clouds is imparted by the rapid change in the intensity of light, besides rendering necessary a continual change of position of the mirror. No ordinary observation is possible in direct sunlight; the eye is dazzled, and balding for the eye to be quite hot; and, in the second place, it cannot be discerned which give rise to the grossest deceptions. In working with the microscope in the forenoon and in the middle of the day, a room lying to the east or to the south, must therefore be avoided: means of white, blue, or green, the inconvenience may, to a certain extent, be avoided.

Many objects are seen very beautifully by lamp-light, but this light is far more glaring than daylight. When the light is made to pass through blue glass before reaching the mirror, this is to be preferred. By this means the eye is protected from direct light, and the light is diffused and directed by the eye to the eye. A piece of white ground-glass, fastened in a wooden frame, and placed before the lamp, will have the same effect. By regulating the light of the lamp in this manner, objects ready prepared may be shown very well at night, but it is hardly possible to make fine preparations.
with such an illumination; for exact observation, therefore, the
daytime only must be selected. In order to intercept the light,
the microscope is placed at least three feet from the window, the
latter of which is carefully shut. If the light is, in fact, sought after;
when the field of view appears clearest and brightest, the object
which is to be observed is placed under the microscope.

When it is desired to examine opaque objects with inci-
dent light, the microscope may often be advantageously
brought nearer to the window. Since for this kind
of illumination a much larger quantity of light is necessary,
direct sunlight is sometimes desirable; in the absence of this,
the condensing lens is used, by means of which the greatest
possible amount of light is concentrated on the object.
In this kind of illumination, the access of light from below,
which would interfere with the observation, is prevented by
closing the diaphragm. For objects which are altogether
opaque, a background which is white, but not glittering, is
often advantageous.

The table at which microscopical observations are under-
taken must be sufficiently large, and very firm; it must be
so arranged that all the apparatus which is ever wanted shall
be within reach of the hand. For so small a space as this,
in microscopical investigation times pass only too quickly;
moreover, in a very confined space, it is impossible to make
effectual preparations with the simple microscope. Every
object intended for investigation should be examined first
with the low-magnifying power, since by that means a far larger portion of the object is seen, and thus a
better impression with regard to the whole is obtained.
Should the light be too strong, the plane mirror may be used instead of the concave one. When that has been done
as much information as he can with the low-magnifying
power, for instance, one of 50 diameters, or, in some cases, even
a less magnifying power, the object-glass is changed for a more
powerful one. When the most powerful object-glass has been
examined, and a still stronger magnifying power is desired, then
a stronger eye-glass is taken. As a general rule, the eye-glass of
lowest power should be used, and, if necessary, the magnifying power should be increased by pass-
ing through the object-glasses of lower power to those of higher
power; but, nevertheless, for seeing with convenience, and
especially for drawing, the use of a powerful eye-glass is
often not without advantage. As long as the magnifying
power can be increased by means of an object-glass, recourse
should never be had to a stouter eye-glass, for the sharpness of outline of the image are necessarily dimin-
ished by the use of a powerful eye-glass, which is not the
case in using a more powerful object-glass.

A good plan is to be followed when the left
hand is made with the left
hand, the eye which looks into the microscope. When
an object is thin enough to be transmitted light, it is first
illuminated with light transmitted directly, and is ex-
amined with different, and gradually increasing, magnifying
powers; should any details of the image remain undefined,
often transmitted light is used, which is instilled into all
the different corners of the object. In some microscopes
this is attained by turning the stage round its axis; where
this arrangement is wanting, the position of the object
must be changed by moving it with the hand. Lines always stand out most clearly when oblique light falls upon them at a
right angle; where, therefore, a line is suspected to exist, or
is only dimly seen, particular attention must be paid to this
circumstance. The object-glass itself is arranged so that the
same rule generally holds good, and particular care must be
taken, by turning either the stage or the object itself, to con-
centrate the light in all possible directions upon the object.
Object-glasses of very high power cannot be used with
incidental light, since then the incident light prevents the
light from falling on the object; in this case recourse must be had to less powerful object-glasses, and more
powerful eye-glasses. As a general rule, low-magnifying
power is used with an incident light.

Objects are frequently examined by polarised light.
In order to effect this an instrument called a polariscope is
employed. That most frequently used is the arrangement
invented by Mr. Nicol. It consists of two prisms of
Iceeland spar, which is fixed on the stage of the
microscope, but another is attached to the eye-piece. Tourmaline is also used for the same purpose.

Large crystals of lodine of quinine
have also been shown by Dr. Harapati to be applicable in
polarising light for the microscope. (Quarterly Journal of
Science, vol. viii. pp. 274, 275.) Microscopical objects often exhibit the structure in a more per-
fect manner. Various objects, especially crystals of a spherical
or oval form, exhibit a beautiful variety of colour in this
way. For some objects it may be made the means of testing the nature of an object.

In most instances, objects are examined under water: it is
but seldom, as, for instance, in examining pollen or spores,
that it is necessary to observe them in different media, and
also so to arrange that a case of different media is ready.

Lines should never be seen under water, but always in
the inverted position; this is more easily accomplished.

In the microscope, for instance, the embryo of grass, to observe
them first without water, and afterwards under water; by this the exact position of the corneal or lens is
obtained. As for the longer hair brush, the object is generally sufficiently and fully immersed. When low-magnifying powers are used, it is not
necessary that the objects should be placed under a glass
cover, in fact, in many cases where it is wished to have the
power of turning the object round, or when it is thought that
the object may be improved by any additional cutting or pre-
paration, it is very advantageous not to cover it; when
object-glasses of very high power are used, the focal distance
is so short that one can, in this case, lay the object, or dip it in
the fluid upon the object plate, it is necessary to make use of glass covers. When these are
used, the fluid in which the object lies frequently becomes
exposed by evaporation, especially in a microscope in which a case of fine dust is added at the edge of the glass cover by
means of a glass rod, or a clean camel's-hair brush, which
may be used when it is wished to add a solution of iodine,
or of chloride of zinc and iodine, to objects which are already
immersed in water.

When any chemical re-agents are used, whether iodine,
caustic potash, or an acid, the object should always be
covered with a thin plate of glass; in using volatile acids,
such as nitric acid and hydrochloric acid, too much care
must be exercised in the prevention of any contact between the
object and the fluid. In many cases, a very injurious effect upon flint glass, which is used by some
opticians for the under side of the object-glass.

When the microscope is in daily use, it is a good plan
to keep it under a high bell-glass, or an ornamental shade.

The greatest cleanliness and accuracy are indispensable
for microscopical investigations: it must be laid down as a rule
that the microscope must never be allowed to come in con-
tact with outside bodies. Excessive things of this kind will
not easily deceive a practised observer; a beginner however
may be easily misled by them. Water which has been left
standing for a few hours, and which contains a little of the
air, contains in it and in- water, dissolved air, in which
contains the inferior sorts of animals and plants, and when
under different objects are examined one after another, fresh water
should be taken for each new object, in order that no
particles of the objects which have been previously examined
may be mixed with the water upon the slide. This may be traced to a neglect of small precautions of this sort.

In order to be able to recognise extraneous objects as much,
it is advisable to gain an acquaintance with those things
which, notwithstanding all precautions, cannot always be
avoided. To this class of things belong: 1st, Air-bubbles,
which, with transmitted light, generally appear in the form
of circles of larger or smaller diameter, with a dark, black-
looking rim: with incident light, on the contrary, their
rim appears green; 2d, Coloured objects, which may be
covered and in contact with it, the large air-bubbles frequently
assume a very irregular shape; the above-mentioned optical
fact is generally however by far the best proof of the
presence of air, and by it the presence of air may be detected
both in and between the cells of plants. Coloured fibres, of
colour, or fine, wool, or silk-threads, left behind upon the object-glasses, from the clothes with which
they have been cleaned, and also the hairs which have
been caught in the hair of the brush, and the dust of irregular shape, which are frequently coloured,
and are probably produced by the decay of organised bodies. If
it is wished to examine plants, or parts of plants, which grow
in or upon the earth, or in water, great attention must
be paid to this subject. If a plant is brought in contact with
the it is not met with; pains must be taken by careful observation to
become acquainted with the lower forms of animals and

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plants: it is necessary, for instance, to be able to distinguish the common forms of Infusoria, both those that are known to be edible and those that are not, because the yeast plant, the different forms of mould, the Oscillatoria, and such like things, in order to be able to separate them from the particular object under consideration.

The epithelial cells of the mucous membrane of the mouth are often seen as such when the brush is drawn through the mouth previously to bringing an object upon the object-plate. It is advisable never to pass the brush through the mouth. When in cutting the cell, it is necessary to be those, and forefinger, or upon the forefinger alone, it often happens that small fragments of the skin of the finger are cut off at the same time. The observer must learn to distinguish these fragments, as well as the small pieces of cork which he will make, from the other fragments of substance. When sections in different directions, must be carefully examined and compared with one another before the observer can be satisfied that he has made out the construction of the body under observation. That which in objects of large size is attained by the help of the knife, is effected, in the case of very small opaque objects, by examining them on different sides. In examining small bodies which are very transparent, as, for instance, the ovules of Orchideae, or grains of pollen or other small objects, the most advantageously placed the watch-glass the question of time to time, by which means the upper side of the object is first brought into the focus, then the middle (which may be called an optical section, transverse or longitudinal, as the case may be), and, lastly, the under-side. The more the object is deformed, the more sensitive is the instrument to any small alterations of the focus, on which account the observer should always keep his hand upon the fine-adjusted screw whilst the adjustment is employed upon observations requiring much accuracy. The sensitiveness above mentioned grows smaller as the objects, in proportion to the magnifying power, and also with the angle of the aperture of the glass.

The accurate adjustment of an object is judged of by the sharpness of its outline, and the manner in which it is placed. The adjustment is more accurate in proportion to the delicacy and sharpness of the lines seen upon small objects, and also in proportion to the fineness and clearness of the outline, which should be both, but well-defined. The scales of the Hippocampa Jancra, a common brown butterfly, are well adapted for enabling a person to judge of the accuracy of an adjustment; the smallest change of focus causes transverse striae to disappear. In examining small round bodies, such as pollen-grains, the position of the object, as the stage is moved, is best judged by pushing the glass-cover so as to cause the bodies to roll about; by this means different sides of the objects are seen, and from the different images presented to the eye their true form is made out.

Small objects should never be compressed between two glass sides, that being too rough a method of proceeding. If however it is supposed that anything is to be gained by compression, then it is advisable to use the compressarium, which is an instrument consisting of a mechanical arrangement by which the thin glass covering an object may be compressed at will. When the compressarium is cautiously used, the observer, by carefully watching what takes place, can gain a knowledge of the changes produced by pressure during the time the compressarium is permitted to work. In certain cases, where, for instance, the question is whether a particular object is a delicate cell or a drop of some fluid, the compressarium may be of service; since, if a cellular membrane be present, it will burst and discharge its contents as the pressure is increased, whereas the drop, whether it be oil, liquid resin, or any other chemical substance upon the slide, will only change its form.

In examining any object, whether animal or vegetable, it is not sufficient to observe the nature, form, and arrangement of the cells; it is necessary also to pay attention to their contents, which, in the case of plants, are different according to the functions assigned to them by nature. It is necessary, therefore, to distinguish—1st, Whether a cell is empty, that is to say, whether it contains nothing, or is filled with perfect vessels and wood-cells; 2ndly, Whether its contents are fluid with a solid substance contained in the fluid. Another question which arises is as to the nature of these contents. They may be of a coagulable fluid, or of a fluid of different consistencies, apparently not intermingling with one another; the manner in which they
bolting-tube; to this is added, in a little while, an equal volume of chlorate of potash, and as much nitric acid as is at least sufficient to cover the wood and the potash; the tube is then warmed over a spirit-lamp; a brisk development of gas quickly appears; the bolting-tube is withdrawn from the flame, the oxidising mixture is permitted to work for a minute and a half or three minutes, and the whole is thrown into a saucer with water: the small pieces which adhere slightly to one another are then collected, placed in the bolting-tube, and boiled repeatedly with alcohol, until the liquid has a transparent appearance. This process is repeated two or more, for the last time, with water. By the help of the simple microscope the cells are now separated from one another with a needle, and selected. The bolting with nitric acid is done on a thin plate of glass, which is carried on in the room where the microscope is kept, because its glass might be injured by the evaporation which is developed. Thin sections of plants, for instance, of woods or leaves, are warmed for half a minute, or a minute, in a watch-glass; the boiling is unnecessary in this case; the section is taken out with a little rod, and thrown into a small watch-glass with water. Nitric acid is one of the best agents for removing animal or vegetable tissues from silicea, as in the case of the Drosophila.

Oil of lemon, or any other essential oil, for examining pollen and spores.

10. A tolerably strong solution of muriate of lime (one part of dry muriate of lime, and three parts of distilled water) for preserving microscopic objects. This is useful for most organic tissues. If it is wished to preserve an object for a few days without mounting it immediately, it is a very good plan to put a drop of this solution upon the object, and to place it under a bell-glass for protection against dust. It preserves the objects for the first few hours; after 24 hours, however, it appears more clearly.

11. Glycerine. This is also well adapted for preserving microscopic objects, and especially for cells which contain starch, which latter substance continues unchanged by it. In granules which exhibit lamination, for instance in the pollen-spores, the lamination is in general continued invisible for the first few hours; after 24 hours, however, it appears more clearly.

12. Copal varnish, or Canada balsam, also for the preparation of microscopic objects; these are only suitable for a few thin sections of wood, or of fossil wood. They both make the object more transparent than the solution of muriate of lime.

13. A tolerably strong solution of carbontartrate of potash, as well as balsam, for digesting fossil woods which have been converted into carboxace of lime. It is also recommended for examining the sweat-dirt in the skin.

14. Acetic acid. This is very useful in examining animal tissues, as it has the power of making the cell-wall clear, whilst the nucleus becomes darker and more distinct. It also distinguishes phosphate or carbonate of lime from oxide of lime, by dissolving the former whilst it has no action on the latter.

15. Very dilute chromic acid. It is used for the purposes of hardening tissues. It is especially useful in examining the structure of the retina.

16. Ammonia will be found useful in the same cases where caustic potash and soda are employed.

17. Nitrate of baryta is used as a test for sulphuric and phosphoric acids. Sulphate of baryta is insoluble in acids and alkalies, while phosphate of baryta is readily soluble in acids, but insoluble in ammonia.

18. A solution of carbonate of soda may be used as a test for chlorides and phosphates. The white chloride of silver is soluble in ammoniac, but insoluble in nitric acid. The yellow phosphate of silver is soluble in excess of ammonia and nitric acid.

19. Oxalate of ammonium is employed as a test for lime, an insoluble oxalate being formed wherever lime is present.

This list of re-agents might be increased, as there is scarcely an operation performed in the laboratory that may not be facilitated by a small stock of the materials admirable in the microscope, and which, if well employed, will greatly increase the number of observations that may be combined with the microscope, and which, if well employed, will greatly increase the number of observations that may be combined with the microscope.
glass, fitted with aground glass cap. It may be fitted with a stand, and will be found useful for submitting objects to heat. The objection to the employment of candles, or lamps, is the black smoke they produce.

2. A small warm bath. This will be found of use for drying the slides, before being mounted in Canada balsam.

3. Watch-glasses are useful for examining substances in fluids with low powers, as by this means a considerable depth of fluid is obtained for observation.

4. The jointing of the slide and cover glass, which is 2 1/2 in. long and 1 in. broad, are useful for mounting and examining all kinds of bodies.

5. Thin glass, called cylinder-glass, of different degrees of thickness, is indispensable for placing over objects, especially those which are soft or fluid when placed upon a slide.

6. Scissors of various sizes will be found convenient for placing thin glass on the slides, as also for placing or removing objects from the slides.

7. Scissors of various sizes will be found convenient for placing thin glass on the slides, as also for placing or removing objects from the slides.

Cement of various kinds are necessary to the microscopic observer who wishes to preserve the objects he examines. They are used for making glass cells to contain objects, on the glass slide, and for fixing the covers over the preparations that have been placed in the cell, and for other purposes. The principal cements need are gold-size, sealing-wax varnish, solution of shell-lac, gum, a French cement composed of lime and India-rubber, Brunswick-black, marine-glaue, and Canada balsam. These cements are sold at the optical stores, and directions for making them are found in some books on chemistry and the microscope.

In order to preserve preparations for a length of time, it is necessary to place them in an air-tight vessel. These vessels are called cells, and are best made of glass. They are also sold where microscopes are procured. With a little practice, however, the microscopist may make his own cells.

Thin cells may be made of various substances. Even paper answers exceedingly well in some cases, and is well adapted for dry preparations. A thin layer of white lead, which has been allowed to dry, has also been employed for the same purpose. White lead, made into a thick liquid with linseed oil and turpentine, has been recommended by some observers. Various other substances have likewise been tried, but where it is required to keep the specimen in some preservative solution, glass is the substance which in all cases forms the best material for making cells.

A blank glass cell is of extreme tenacity that it is only necessary to place them on the slide with a drop of some preservative solution, and then to cover them with a square of thin glass, the edges of which have been anointed with gold size or other appropriate cement. The superfluous fluid is next absorbed with bibulous paper, and the slide allowed to dry for a few minutes. A layer of gold-size or other cement is then applied round the edges of the thin glass in order to fix it to the slide. In this way an excessively thin cell may be formed; but preparations made in this manner should be kept for any length of time without the entrance of air-bubbles. This arises from the outer layers of the gold-size drying more rapidly than the more internal layers. By the contraction thus produced the edges of the cement are drawn off from the glass, to which however it does not adhere with great tenacity in consequence of the surface being highly polished. It is therefore always better to make very thin cells of glass or other material, which can be cemented to the glass all in one piece. Such a cell can be made by the cell by painting the slide with a ring of varnish, marine glue, or Brunswick black, and allowing this to dry thoroughly before the preparation is placed in it. In this manner the thinnest cell may be made in the shortest time.

Perhaps Brunswick black is, for the purpose just mentioned, the best. It is painted upon a glass slide with a fine camel's-hair brush, and allowed to dry perfectly, when, if the cell is not sufficiently thick, another layer may be applied. If the cell be required immediately, it is better to warm the slide slightly before applying the varnish. If too great a degree of heat however be employed, the varnish becomes brittle and the cell unfit for use.

Very thin cells may be made of tin-foil. This may be easily accomplished by cutting with a pair of scissors a piece of thin tin-foil the size of the cell which it is desired to make. A hole is cut in the centre of the tin-foil sufficiently large to hold the preparation which is to be preserved, and this is then fixed over the glass slide with marine glue. When cold the cell may be placed upon a piece of thin tin-foil, or rubbed with a little emery upon a piece of plate glass, and the marine glue should be afterwards removed from the centre with a little solution of potash; or the object may be fixed in the same way as in other cases. Thin cells have also been made of gutta percha, but there is great difficulty in fixing the cell firmly upon the glass slide. This however has been effected by some observers; but in consequence of the difficulty it is a method not generally employed.

Preparations however mounted in cells composed entirely of gutta percha keep very well for a length of time.

Cells composed of very thin glass are perhaps the most convenient for the preservation of objects, especially for many preparations. They may be obtained of different degrees of thickness, and are made usually by perforating the thin cylinder glass which is used for covering the cells, or by grinding sections of a thin glass bottle to the required size. They also may be fixed by being immersed in various fluids. A great number of squares of thin glass are cemented firmly together with marine glue; and when cold a hole of the required size is drilled through them all. They are next separated from each other by heat, and, after being cleaned with potash, may be fixed on the glass slides with marine glue in the usual way, and kept ready for use. It is a good plan to roughen the surface of these cells, which renders the subsequent entry of air less likely, as the glass-size adheres much better to a rough surface than to a polished one. This is readily effected by rubbing the cell, after it has been fixed upon the glass slide, up and down a narrow hone or strip of plate glass on which some moistened emery powder has been placed. In this way also the thickness of the cell may be reduced if required. (Beal.)

Cells of any thickness or depth may be made for larger objects, but those described will be found most convenient. If it is only required to examine the character of a specimen in a dry state, it may simply be laid upon a glass slide and placed in the field of the microscope; if however the substance be of a very delicate structure, or in a minute state of division, it is better to place a piece of thin glass over it in the usual manner in order to protect it.

Dry objects may be placed in a glass slide or in a paper cell, or if of extreme tenacity they may simply be placed on a glass slide and covered with thin glass, which should be fixed to the former by a small piece of gummed paper or by a piece of cellophane, cut to the same size as the glass slide, on which a hole has been cut of sufficient size to permit the entire object being seen. The paper may of course be of any colour, or ornamented according to the taste of the operator.

When objects are to be examined by reflected light they may be placed in little glass or card-board cells, or in pith-boxes, or they may be put up in glass cells. The preparation should be placed upon a dark ground, which may be protected either by a cover-glass or by a fine sheet of paper of the exact size of the cell and placing it within; or the black paper may be fixed on the posterior surface of the slide; or this surface may be covered with black paint or black varnish.

There are various methods by which preparations may be subjected to examination, and preserved as permanent objects in a moist state, and the different value of the various preservative solutions which are in use entirely depends upon the character of the object, and nature of the preparation. Dry preparations form a very good fluid for some objects, whilst for the preservation of most it is necessary to immerse them in water impregnated with some antiseptic agent, which is not volatile at ordinary temperatures. Many again are best preserved in a sealed glass tube, which is difficult to lay down rules which will enable the observer to choose a preservative fluid for any particular specimen. A little experience however will soon enable him to judge which solution is best adapted for the purpose.
We take the following account of several preservative solutions from Dr. Beale's valuable work on 'The Microcosm of London.'

**Spirit and Water.** — Mixtures of spirit and water of various strengths are required for preserving different preparations. In diluting spirit distilled water only should be employed; for if common water be treated with spirit, a precipitation of some of the salts dissolved in it may frequently take place, rendering the mixture turbid and unfit for use. Proof spirit will be strong enough for all general purposes, except for hardening portions of the brain or nervous system, when strengthened, if necessary, with water. Two parts of a rectified spirit, about specific gravity 837, mixed with one part of pure water, makes a mixture of sp. gr. 915-920, which contains about 49 per cent. of real alcohol, and will therefore be about the strength of proof spirit. One part of alcohol, 69 over-proof, over-proof water, forms a mixture of sufficient strength for the preservation of many substances.

Glycerine. — A solution of glycerine adapted for preserving many structures is prepared by mixing equal parts of glycerine with camphor water. The latter prevents the tendency to mildew. It may be used as other preservative solutions.

Glycerine is obtained by boiling oil with latharse. The oleate of lead remains as an insoluble plaster, while the glycerine is dissolved. It may be rendered free from lead by passing the mixture through a column of charcoal; and the clear solution, after filtration, may then be evaporated to the consistence of a syrup.

**Thwaites's Fluid.** — This fluid has been much employed by Mr. Thwaites for preserving specimens of *Drosophila,* but it is also applicable to the preservation of animal substances.

| Water | 16 ounces |
| Spirits of Wine | 1 ounce |
| Creasote sufficient to saturate the spirit. |
| Chalk, as much as may be necessary. |

Mix the creasote and spirit, stir in the chalk with the aid of a pestle and mortar, and let the water be added gradually. Next add an equal quantity of water saturated with camphor. Allow the mixture to stand for a few days, and filter. In attempting to preserve large preparations in this fluid, I found it always became turbid, and therefore tried several modifications of it. The solution next to be described was found to answer very satisfactorily. Water may also be impregnated with creasote by distillation. It should be borne in mind that M. Strauss-Dürckheim has succeeded in preserving preparations in camphor-water only.

**Solution of Naphtha and Creasote.**

| Creasote | 3 drachms |
| Wood Naphtha | 6 ounces |
| Distilled Water | 64 ounces |
| Chalk, as much as may be necessary. |

Mix first the naphtha and creasote, then add as much prepared chalk as may be sufficient to form a smooth thick paste; afterwards add, very gradually, a small quantity of the water, which must be well mixed in a mortar. Add two or three small lumps of camphor, and allow the mixture to stand in a lightly-covered vessel for a fortnight or three weeks, with occasional stirring. Pour off the almost-clear supernatant fluid, and filter it if necessary. Preserve it in well-corked or stoppered bottles.

I have some large preparations which have been preserved in upwards of a pint of this fluid, for more than five years, and the fluid is now perfectly clear and colourless. Some dissection of the nervous system prepaions have kept excellently—the nerves keeping their colour well, and not becoming at all brittle. Two or three morbid specimens are also in an excellent state of preservation; the colour being to a great extent preserved, and the soft character of the texture remaining. I have one preparation mounted in a large guita percha cell, containing nearly a gallon of this fluid.

**Solution of Chronic Acid.** — A solution of chronic acid will be found well adapted for preserving many microscopic specimens. It is particularly useful for hardening portions of the nervous system previous to cutting thin sections. The solution is prepared by dissolving sufficient of the crystallised acid in distilled water, to render the liquid of a pale straw colour.

The crystallised acid may be prepared by decomposing 100 measures of a saturated solution of bichromate of potassa, by the addition of 120 to 150 measures of pure concentrated sulphuric acid. As the mixture becomes cool, crystals of bichromic acid, which should be dried and well pressed on a porous tile, by which means the greater part of the sulphuric acid is removed, and the crystals obtained nearly pure.

**Preservative Gelatine.**

| Gelatine | 1 ounce |
| Honey | 1 ounce |
| Spirits of Wine | 4 ounces |
| Creasote | 6 drops |

Soak the gelatine in water until soft, and to it add the honey, which has been previously raised to the boiling-point in another vessel. Next let the mixture be boiled, and after it has cooled somewhat the creasote dissolved in the spirits should be added. Lastly, filter through thick flannel to clarify it. When required for use, the bottle containing the mixture must be slightly warmed, and a drop placed on the preparation upon the glass slide, which should also be warmed slightly. Next, the glass cover, after having been breathed upon, is to be laid on with the usual precautions, and the edges covered with a coating of the Brunswick black varnish. Care must be taken that the surface of the drop does not become dry before the application of the glass cover; and the inclusion of air-bubbles must be carefully avoided.

**Geadby's Solution.**

| Bay salt | 4 ounces |
| Alnun | 2 ounces |
| Corrosive Sublimate | 4 grains |
| Spirit of Wine | 2 ounces |

Mix and filter. This solution may for most purposes be diluted with an equal bulk of water. For preserving delicate preparations it should be even still more dilute.

**Burnett's Solution.** — This fluid has been patented. Its preservative properties appear to depend upon the chloride of silver. A strong solution of chloride of silver forms a very powerful antiseptic, and also possesses the property of absorbing noxious odours, &c.

**Other saline solutions.** — Many other saline solutions have been employed by different observers. Of these, a saturated aqueous solution of chloride of calcium, free from iron, has been much recommended for preserving specimens of bone, hair, teeth, and other hard structures, as well as many vegetable tissues (Schecht). A solution of alum in the proportion of 1 part of alum to 16 parts of water has been found to answer preserving all some substances. Ganass's solution, which consists of 1 part of acetate of alumina dissolved in 10 parts of water; solutions of common salt (1 part to 5 parts of water, with a little camphor), corrosive sublimate, per sulphate of barytes, arsenious acid, sulphate of zinc, and solutions of several other salts, have been recommended as preservative solutions, but their employment has not been always attended with the most satisfactory results.

Arseniated hydrogen gas has also been recommended for the preservation of animal substances, but it is not adapted for microscopical preparations.

**Canada Balsam.** — Canada balsam forms a most useful agent for mounting various substances; and the structure of many can only be clearly made out when they are examined in this menstrum.

In this method of mounting objects no cells whatever are requisite. The balsam should be pale and old. The glass slides must be warmed before the balsam is put on; and for this purpose the glasses may be held in a pair of tongs, or in a plate or pan of warm water. About a quarter of an ounce of balsam is to be spread upon a sheet of wax paper, which is covered with cork, and heated over a spirit-lamp or upon a brass-plate. The latter plan is the most convenient when several preparations are to be mounted at the same time, because they may be arranged in a row along the plate, and the balsam placed upon each slide as it becomes hot.

The Canada balsam may be heated after it is placed upon the slide, in order to allow the air-bubbles entangled in it to rise to the surface before it is applied.

The slide being warm, and the small quantity of Canada balsam sufficient to contain the preparation having been placed upon it, it must be gently moved about while the balsam is warm and quite fluid, until all the air-bubbles have floated to the surface, and collected together towards one spot. A pointed wire or needle should then be taken, and all the bubbles either drawn out upon the end of it.
which may be readily effected, or broken by the wire after it has been heated. In those cases in which the preparation is not detached from the glass slide upon which it has been allowed to dry, it is only necessary to place the drop of balsam upon it and gently warm it, following the usual precautions; afterwards the thin glass cover may be applied. When the preparation has been dried separately over the water-bath and cleaned, it may be taken in a fine pair of forceps, gently warmed, and carefully placed in the hot and perfectly dry balsam. After it has been thoroughly wetted by the balsam, and all adhering air-bubbles removed, it may be placed in the position it is intended to occupy. The thin glass cover, adapted to the size of the preparation having been previously cleaned and warmed, must then be taken in a pair of forceps and, after being placed in the balsam for a minute, allowed to fall gradually upon the preparation (beginning at one side), until it becomes perfectly wetted with the balsam. The glass may now be slightly pressed in order to force out the superfluous balsam, and the preparation allowed to cool.

We now proceed to give a few directions for the examination of particular objects, more especially animal tissues, as these of all others are the most difficult to manage. In the examination of transmission or of other tubular organs, it is frequently most desirable that injections should be made before they are submitted to the microscope. This operation requires great delicacy. A very small orifice in the injection tube, which must be adapted to the structure, must be employed. The fluid injected consists of size or gelatine, colored with various substances, as vermillion, merthiolate, and iodide of mercury, chromate of lead, indigo, Prussian blue, white lead, &c., according to the color of the structure to be examined.

The following general rules for injection are given by Dr. Baile:—Great attention should be paid to the cleanliness of all the instruments to be used in injecting. The syringe should always be kept scrupulously clean and in good order, and the injection tube, when not in use, to prevent the ingress of dust. Before commencing the operation, plenty of warm water should be at hand; and the subject should be allowed to soak for some time in a basin of hot water, before it is attempted to inject it, in order that it may be thoroughly warmed through. The temperature of the water must vary according to the degree to which the injection is required to be heated: if size and vermillion be used, the water need only be warm; but if melted wax be employed, the water must be so hot that the hand can scarcely be borne on it. The length of time which the preparation is allowed to soak must depend upon its bulk; and the water should be changed as soon as it becomes at all cool. With respect to the length of time which the subject be kept in the water, no absolute rules can be given. Generally, it may be remarked that we should not attempt to inject while the rigor mortis lasts. Many days may in some cases with advantage be allowed to elapse, particularly if the weather is cold, when the organ is removed from the body, and kept under a cool atmosphere after death. As a general rule, the more delicate the tissue, and the thinner the vessels, the sooner should the injection be performed. Many of the lower animals, annelids, molluscs, &c., and fishes, should be injected soon after death. In making minute injections of the brain, only a short time should be allowed to elapse after the death of the animal, before the injection is commenced. Injections of the alimentary canal of the higher animals should be performed earlier in the summer, and later in the winter.

When the preparation is warmed through, the injection properly strained, and the pipe fixed in the vessel, we may proceed carefully to inject, taking care that the injection is kept at a proper temperature, by allowing it to remain in the warm water-bath during the operation.

The air should be first withdrawn from the upper part of the vessel by means of the syringe, after which the stopcock is turned off and left attached to the pipe. The syringe is then filled with fluid, which should be done twice with warm water, is nearly filled with injection, which must be well stirred up immediately before it is taken. The syringe should not be quite filled, in order that the air in the pipe may be made to rise into the syringe through the injection. When the fluid is properly warmed, it is forced into the vessel. The end of the syringe is then to be pressed firmly into the upper part of the stop-cock, with a slightly screwing movement.

The piston is now very gently forced down by the thumb until the syringe has been nearly emptied, when the stopcock must be turned off, and the syringe refilled with warm injection as before.

Care must always be taken to keep the syringe in an inclined position, so that any air which may be in it may remain in the tube, and, further, that the injection should not be forced out, for fear of the inclosed air entering the vessels, in which case all chance of obtaining a successful injection would be destroyed.

After a careful examination of fluid has been injected, it will be necessary to use a greater amount of force, which, however, must be increased very gradually, and should only be sufficient to depress the piston very slowly. If too great force be employed, extravasation will be produced before the gas escapes from the cavities, and this is followed by an increased pressure, kept up for a considerable time, will cause the minute vessels to become slowly distended without giving way to any great extent. At the same time it must be borne in mind that extravasation frequently occurs at various points in a successful injection; but the longer this event can be kept off, the more likely we are to succeed.

In order to examine the structure of many tissues, it is necessary to obtain a section sufficiently thin to permit the eye to see distinctly. In other cases, the eye will not easily see the minute structure of the tissue may be submitted to examination in every part of the section. The difficulty of making thin sections of many textures is very great, and, to effect this object satisfactorily, a knowledge of certain mechanical and optical principles is indispensable. It is necessary to cut a thin section of a soft pulpy texture, which can scarcely be touched without injuring its delicate structure, and altering the position of its constituents; while, in other cases, we have to deal with a softer substance so hard that steel tools will scarcely scratch it, such as the enamel of teeth, fossil teeth, &c.

Previous to the examination of a tissue, boiling is frequently of service.

For instance, the fibres of which the crystalline lens is composed are best shown after boiling the lens in water. The branched muscular fibres in the tongue of the frog, and in other situations may be made out very readily by boiling the tissue in water for a few minutes; and then tearing up small portions with fine needles. Beautiful sections of muscular fibre can often be obtained after the texture has been boiled in water. Various glands and other textures often require to be boiled some time in water, in order to harden them sufficiently to cut thin sections; but in all cases the microscopical characters of the recent texture should be examined, as well as that which has been hardened by boiling. Small portions of tissue can be readily boiled in a test-tube over the spirit-lamp moments, and then tearing up small portions with fine needles. Boiling in water frequently enables us to tear up a tissue very readily with the aid of needles, and thus to demonstrate its structure. Occasionally it is found necessary to press the tissue, and rub parts of it together, before the soft pulpy portions can be got rid of. In this way we may demonstrate the supporting or trabecular tissue of the spleen, and the areolar and vessel tissue of the liver, &c. Thin sections of kidney, liver, and other organs, which are nearly soft, when the matrix is to be subjected to examination separately.

Thin sections of various tissues can frequently be obtained only by first drying the substance thoroughly, and then cutting off a thin shaving with a sharp knife. In this way the specimens of skin, muscles, &c., which are usually of a soft pulpy nature, are often most advantageously prepared. The tissue is stretched on a board with pins and then allowed to dry, when a very thin section can be cut off and examined in a microscope. In the case of the brain, it may be put in a boiling solution of alcohol, and then allowed to dry at room temperature, in which case, when subject to examination, it will often be found to have regained its first appearance. Portions of muscular fibre, the tongue, skin, and many other tissues, may be allowed to dry in this manner, and then we may with a sharp knife cut off the excess, which would otherwise could not be procured in any other manner. The drying may be effected in a warm room, or in a current of air. A high degree of artificial heat should be avoided.

When the inorganic portion of a tissue which we wish to
examine is not altered by exposure to a red heat, recourse may be had to ignition, in order to get rid of the animal matter. In this way crystals of carbonate and phosphate of lime, as well as silicious or organic matter, are separated from the organic material with which they were combined. The beautiful silicious shells of the Diatomacea may be separated from organic matter by a similar process. The ignition should be performed in a small platinum crucible, or upon a small iron plate. The crucible should be placed over a spirit-lamp. The carbonaceous residue must be exposed to the dull red-heat of a spirit-lamp for some time, until only a pure white ash remains, which will be found to contain the objects of our search in a perfectly clean state. The ash may be examined, and if necessary, treated, the ash should be treated with strong nitric acid, which will dissolve any carbonate or phosphate. The insoluble residue may then be washed and dried, and subjected to microscopic examination whilst immersed in turpentine or Canada balsam. In many cases this method is superior to that of boiling in nitric acid in order to remove the organic matter. Both processes may however be employed where only the silicious residue is wanted, but if we require the salts of lime, ignition at a dull red-heat is alone applicable.

In order to subject a portion of tissue or other substance to examination by transmitted light, the following plan is adopted:—One of the glass slides is carefully cleaned, and the thin section of tissue which has been removed by the aid of a knife or a scalpel is placed in the centre of a drop of clean water is then added, and the whole covered with a square of thin glass, also perfectly clean. If the under surface of the thin glass be gently breathed upon, it becomes perfectly transparent. The specimen may be unravelled with needles, or, if necessary, any other operation performed before covering it with the thin glass. If the substance be covered with too much soft pulpy matter, it may be slightly washed in water before being placed upon the slide, or a jet of water from the wash-bottle may be forced upon it. Thin sections will require to be laid flat upon the slide, with the assistance of needles and forceps.

Hard tissues require a different treatment. Here the great object is to examine thin enough for the object to be seen by transmitted light. Many hard substances, such as nail, horn, and dried animal textiles, may be cut with a strong knife, or with a mazer; an operation which is easily performed by placing the substance upon a piece of soft deal board, and, after cutting a smooth edge, removing a thin shaving, which may be examined dry or in fluid, or may be placed in Canada balsam, as occasion may require.

Such substances as bone, ivory, and fossilised rocks, should be cut in thin sections with the aid of a sharp saw. These sections should then be pared down to the necessary fineness upon a hone or smooth stone. This may be effected in the following manner.—The section, after having been cut, is immersed in a little water, and the ground surface before it can be subjected to examination. It may perhaps be as much as the tenth of an inch in thickness when the grinding is commenced, but by rubbing it for a short time upon a smooth stone it may be reduced to the proper degree of tenacity. Stones which are well adapted for this purpose are the 'Charley Forest' stones, the Turkey stones, or the Water of Ayr stones, about an inch or more in width, and six inches in length. Each of the four sides should be perfectly smooth. Other stones, even a piece of slate, answer also very well, and may be procured at much less cost. The stone is wetted with a little water, and the section rubbed up and down with the finger, or with a piece of cork or leather. A very good plan also is to immerse the section slightly in a piece of warm gum percha, which should extend only a very short distance beyond the edges. This is to be rubbed up and down upon the wet hone, water being added as required, till the surface is perfectly smooth, when the section is to be taken off, turned round, and ground down on the opposite side until it is sufficiently polished. The section may also be ground down expeditiously by rubbing it between two hones. If very thick, it will be better to reduce it somewhat with the aid of a flat file before commencing the grinding. After being ground a little thinner, the section may be placed in the microscope, when numerous dark lines will be found all over the surfaces; these must be removed by polishing. The deepest of the scratches may be obliterated by fusing the specimen upon a very smooth part of the hone quietly.

Teeth require a little more attention than other hard sub-

stances. They should be first ground down upon a lapidary's wheel, or upon a dentist's emery wheel. Sections can also be readily cut with a diamond saw (an iron wheel, the edge of which is sharpened when it is dull) by laying the specimen upon a metal foil. The thin section is now to be soaked for a short time in ether to remove the fatty matter, and then allowed to dry. It is to be subjected to examination in the dry way, moistened with water, turpentine, or Canada balsam, and the different appearances in each case should be carefully observed.

The cartilaginous basis is to be examined also in this sections, which may be cut either before macerating in acid, or afterwards, when the more readily soluble part of the acid will become soft in four or five days, when thin sections of different parts may readily be cut with a sharp knife. The dentinal tubes may be isolated from each other by longer maceration in acid, and afterwards by soaking for a few days in nitric acid. A strong spirit-lamp may be employed in this investigation to cut the thin section before maceration in acid, or to macerate the tooth until moderately soft, and then remove a thin section, which is to be further exposed to the action of the strong acid. A mixture of sulphuric and hydrochloric acids has also been recommended.

The examination of fluids does not require so much art as that of solid matters. Where it is wished to examine the whole of the contents of a fluid, all that is necessary is to place the fluid into a wash-bottle, or, if a vessel of thin glass. It frequently happens however that it is the matter suspended in a fluid that is desirable to examine. Under these circumstances the fluid should be placed in an ordinary vessel, and it is then advisable to set the supernatant liquor should be poured off, and a drop of the deposit conveyed to the glass slide. In other cases a pipette may be made use of to draw up the deposit from the bottom of the test-tube or other vessel in which it may be held. In examining water to ascertain the nature of the deposit in a wash-bottle, or small muslin-bag or net may be employed, through which the water may be poured, and the contents of the bag placed on the slide. In this way the 'Dusmilids' and some of the larger forms of Infusoria are best procured for examination. The nature of deposit is very variable, and the following plan will be found of practical utility. After allowing the lower part of the fluid which has been standing to flow into the pipette as above described, and removing it in the usual manner, the finger is applied to the orifice, in order to prevent the escape of fluid when the upper orifice is opened by the removal of the finger. The upper opening is then carefully closed with a piece of cork. Upon now removing the finger from the lower orifice, the fluid will not run out. A glass vessel covered under the pipette, which is allowed to rest upon it for a short time. It may be suspended with a piece of string, or supported by a small retort-stand. Any traces of deposit will subside to the lower part of the fluid, and the amount of necessity be collected in a small drop upon the glass slide, which may be removed and examined in the usual way.

Another plan is to place the fluid with the deposit removed by the pipette in a narrow tube, closed at one end, the end of which is rather less than a quarter of an inch in diameter. This may be inverted on a glass slide, and kept in this position with a broad elastic India-rubber band. The deposit with a drop or two of fluid, will fall upon the slide, but the escape of a further quantity is prevented by the nature of the arrangement. Amongst the fluids of the human body which may with advantage be submitted to examination with the microscope, there is none of more importance than the urine. This fluid being the great abode which nature employs to rid the system of the used-up and effete matter of the body, becomes an index by which the completeness, redundancy, or insufficiency of this function may be examined. The following hints for the examination of this fluid will be found useful. The urine which is to be studied should be collected in sufficient quantity, in order to obtain sufficient of the deposit for examination.

In all cases the urine should, if possible, be examined within two hours after its secretion, and, in many instances it is important to institute a second examination after it has been allowed to stand for 24 hours. Some specimens of urine pass into decomposition within a very short time after they have escaped from the bladder; or the urine may even be drawn from the bladder actually composed.

In other instances, the urine does not appear to undergo
decomposition for a considerable period, and may be found clear, and without any deposit a day or two, or even longer, after it has been removed.

In those cases in which a large quantity of lime is present, we shall find that the deposit increases in quantity after the urine has stood some time. The latter salt is frequently not discoverable in urine immediately after it is passed, but makes its appearance in the course of a few hours; depending upon a kind of acid fermentation, which has been the subject of some beautiful investigations by Scherer.

In order to obtain sufficient of the deposit from a specimen of urine for microscopical examination, we must place a certain quantity of the fluid in a conical glass, in which it must be permitted to remain for a sufficient time to allow the deposit to settle into the lower part.

Urinary deposits often require to be examined with different magnifying powers, those which are most frequently used being the inch and the quarter of an inch. Large crystals of lactic acid are often readily distinguished by the former, but crystals of this substance are sometimes so minute that it is absolutely necessary to use high powers. Opaque hydroxide of lime is frequently found in small that they cannot be seen with any power lower than a quarter; and, in order to bring out the form of the crystals, higher magnifying powers than this are sometimes necessary. Spermatozoa and erythrocytes often become ruptured and disappear very quickly. In these cases, an eighth of an inch objectglass will be of advantage. The casts of the tubes, epithelium, and the great majority of urinary deposits, can, however, be very satisfactorily demonstrated with a quarter of an inch objectglass.

In the investigation of these deposits which are prone to assume very various and widely-different forms, such as lactic acid, it will sometimes be necessary to apply a microscope, and, in some of the most minute tests, to use the nature of the substance under examination can be positively ascertained.

The urine is very liable to the introduction of foreign substances. A paper on this subject by Dr. Beale will be found in the first volume of the Quarterly Journal of Microscopical Science, and an addition to the same, occasionally found by Dr. Beale—Fragments of human hair; cat's hair; hair from blankets; portions of feathers; fibres of wadded of various colours; fibres of cotton of various colour; fibres of flesh; potato starch; rice starch; wheat starch, broad-crumbs; fragments of leaves, or separated spiral vessels and cellular tissue; fibres of coconuts or other wood, etc. The crystals of the urine are usually found in the course of half an hour, or even sooner if it be diluted with a little water or alcohol. Dog's blood also crystallises in the course of a short time upon the addition of a little alcohol. Human blood also crystallises in the addition of a very large quantity of water at a very low temperature. The crystals form more readily in daylight than in the dark, but most rapidly when the slide is exposed in the light of the sun.

Ginneas-pig's blood crystallises in the course of half an hour, or even sooner if it be diluted with a little water or alcohol. Dog's blood also crystallises in the course of a short time upon the addition of a little alcohol. Human blood also crystallises in the addition of a very large quantity of water at a very low temperature. The crystals form more readily in daylight than in the dark, but most rapidly when the slide is exposed in the light of the sun.

It is obvious from what has been said above that the microscope is one of the most important instruments of the physician, and research that is of the highest importance to the characters of these bodies the student should be perfectly familiar as soon as possible; and, as they may be obtained without the slightest difficulty, this is easily effected. For the nature of the deposits found in the urine, see the article Urine.

The examination of the other fluids of the animal body presents little difficulty. Next to the urine that is of most importance. In order to examine the blood, a small drop is placed upon a glass slide, and covered with thin glass, which is to be prepared until a very thin, transparent, and almost colourless stratum only remains. If in this manner the individual globules cannot be seen distinctly, a little syrup or serum must be added; but it is better to avoid the addition of any fluid, if possible. Upon carefully focusing, the red globules will appear to present a dark centre and light circumference, or the reverse, according as the focus is altered, and here and there a white corpuscle may be observed.

In taking blood syrups are added to a drop of blood, the corpuscles will be found to have become flatter from exposure of a part of their contents; while, on the other hand, if placed in water, they become spherical from endosmosis, and ultimately have a spherical density to that in the interior of the corpuscle; and in this manner, as Dr. Rees expresses it, we may take the specific gravity of a blood-corpuscle, if we ascertain the specific gravity of the solution which has been added to the blood.

Acetic acid causes the membrane of the corpuscles to become more transparent and clear, and to swell up from endosmosis. After the application of this reagent, the blood-corpuscle may be scarcely visible, but the membrane cannot be dissolved by it. Strong hydrochloric and nitric acids do not dissolve the globules; with the latter re-agent the outline is often rendered darker and thicker, while the entire globule becomes smaller. The corpuscles are entirely soluble with the acids of the gastric juice, and after remaining in acid urine for some time a similar change occurs; hence the black colour of blood which has been defused into the urine, and the dark smoky bus of acid urine containing blood.

We have before spoken of the crystals to be obtained from the blood. These crystals are very readily obtained by diluting blood with water. A drop of blood may be placed upon a glass slide, and after the addition of a drop of water, alcohol, or ether, the whole should be lightly covered with thin glass. A hair, or a small piece of thin paper or wood, may be placed between the glasses, in order that a stratum of fluid of sufficient thickness may be retained. Whenever it is possible, it is preferable to use distilled blood. Often the corpuscles and a little serum may be removed from the clot by firm presssure, and from this very perfect crystals may frequently be obtained. The blood-corpuscles may be obtained and preserved in this manner, and crystallised as the solution gradually becomes concentrated. The time which elapses before crystallisation takes place varies from an hour to several hours or days in different species of blood. Crystals may also be obtained in a similar manner from the drops of blood.

The form of the crystal often varies slightly in the same specimen, but the blood of different animals yields crystals of very different forms. The prismatic form is most commonly before; cubic, octahedral, and cubo-hexagonal; and, as usual, it is frequently seen in the preparations of urine, that is, in the urine of the guinea-pig, while six-sided are formed in the blood of the squirrel, mouse, and some others. Teichmann has succeeded in obtaining crystals from the blood of fishes. Sometimes they are seen in a very large quantity of water at a very low temperature. The crystals form more readily in daylight than in the dark, but most rapidly when the slide is exposed in the light of the sun.

The crystals of the urine are usually found in the course of half an hour, or even sooner if it be diluted with a little water or alcohol. Dog's blood also crystallises in the course of a short time upon the addition of a little alcohol. Human blood also crystallises in the addition of a very large quantity of water at a very low temperature. The crystals form more readily in daylight than in the dark, but most rapidly when the slide is exposed in the light of the sun.
part of the genito-urinary mucous membrane, or to more general disturbance in the changes which take place in primary and secondary assimilation.

Fatty Degeneration.—Of late years the remarkable changes which take place, and which have been described under the name of Fatty Degeneration, in some of the highly nourished and well-fed animals, the gradual change of which their properties become changed, and their functions impaire, or altogether destroyed, have been undergoing careful investigation by a vast number of highly-talented investigators.

The recent discovery of a state of fatty degeneration affecting the arteries of the brain, in the majority of cases of apoplexy, by which the strength of their coats becomes deteriorated, and their elasticity entirely destroyed, would lead us to think that this disease is an independent reaction upon complicated changes affecting nutrition, than upon the presence of a condition of plethora or hypersemia, as was formerly supposed and acted upon.

The connection between fatty degeneration of the margin of the cornea (arcsus senilis), and similar changes taking place in the muscular tissue of the heart (a subject which has been carefully investigated by Mr. Canton), or in the cerebral vessels, must be regarded with great interest by every philosophical mind.

The microscopical examination of the matters vomited in certain cases has proved to us that the presence of minute fungi, originally discovered by Professor Goodeir, and named by him Sarcina Ventriculi, occurs in connection with the chylous matter in the stomach. These remarkable cases are much more frequently met with than was formerly supposed, and form an exceedingly interesting class of diseases. [Entophyta, S. 2.]

The Microscopic Growth.—The microscope has many times afforded important aid in the diagnosis of tumors, although it has certainly failed in many instances; which circumstance has been brought forward by some, as an argument against its employment altogether. After careless and hasty examination, the best observers have failed in deciding as to the nature of a particular tumor submitted to examination; and they have been unable to pronounce as to its malignant or non-malignant character.

On the other hand, not unfrequently this question has been positively and correctly answered in the affirmative or negative, and therefore it would surely not be right altogether to discard the use of an instrument which, although eminently useful in many instances, is not infallible; for it would appear to be the opinion of some, that the use of the microscope ought to be altogether abandoned in the diagnosis of tumors.

The discovery of Imposition the microscope is invaluable. This has naturally followed that, in consequence of the frequency with which urine is usually submitted to examination, patients often resort to various expedients to deceive the practitioner. Perhaps flour, starch, sand, and milk are more frequently employed for this purpose than any other substances; the microscope, however, is so powerful as to enable any one to detect the first three. If milk be added to urine, the mixture may very readily be mistaken for a specimen of the so-called chylous urine. Although a considerable quantity of fatty matter is present, in either case this fatty matter exists in a very disintegrated state. In milk we find the oil-globules, so characteristic of this fluid, while in true chylous urine not a single oil-globule can be found, although the specimen may contain a large quantity of fatty matter in a more or less state.

<MDM> Larva of the Blow-Fly in Urine.—A specimen of urine containing several bodies of about half an inch in length, and of a rounded form, was once sent to Dr. Todd for examination. The bodies in question looked not unlike the larvae of some large fly, but, as it was confidently affirmed that they were passed by the urethra of a gentleman, the accuracy of this view of their nature was doubtful.

Upon placing a portion of one of them under the microscope, we observed no trace of any trace of the class of insects) were observed in considerable numbers; and the circumstance alone enabled me to say positively that they were not Entozoa, and that they could not have been passed in the manner stated. They were afterwards proved to be the larvae of Sarcina Ventriculi.

The claws of Entozoa and portions of hydatid cysts occasionally are seen in the urine, spuits, &c., upon submitting portions of these fluids to microscopic examination, proving beyond a doubt the existence of tapawas. [Entophyta, S. 2.]

Substances passed by the Bowels.—If the patient have a good knowledge of the use of the microscope, he can often ascertain the nature of substances passed from the alimentary canal; and by the aid of this instrument be can often discover the true nature of substances which, to the unaided eye, only present most doubtful characters. Considerable perplexity has arisen from the presence of bodies in the stools of patients, which afterwards turn out to be portions of almonds, potatoes, or other substances. In the examinations of the food, have resisted the process of digestion, have been met with in the faces, and mistaken for small intestinal worms, which they much resemble when examined by the unaided eye. Upon being subjected to a microscopical examination their true nature was readily discovered.

In Medical-Legal Inquiries the microscope has often afforded valuable aid. The distinction between blood-spots and red stains produced by fluids resembling blood in color—blood in the urine and that of animals—and the detection of spermatozoa in cases of rape, need only be added as examples of the importance of the microscope in such investigations.

For Detecting Impurities in Food and Drugs the microscope is of immense importance, and there are several other purposes to which it may be applied.


MICROSCOPY: [DURHAM; YORKSHIRE.]

MIDDLESBROUGH. [YORKSHIRE.]

MIDDLETOWN. [KENTUCKY.]

MIDDLETOWN. [DURHAM; LANCASHIRE.]

MIDDLETOWN [MINNESOTA. [MINNESOTA.]

MIDDLETOWN. [CONNECTICUT.]

MIDDLETOWN. [NEW JERSEY.]

MIDDLETOWN, county of Cork, Ireland, a port- and market-town, and the seat of a Poor-Law Union, is situated near the head of the north-eastern branch of Cork Harbour, is 81° 55’ N. lat. 8° 10’ W. long., 134 miles E. from Cork by road, and 1734 miles W. from London. The population in 1851 was 3676, besides 2334 inmates of the workhouse. Middletown Poor-Law Union comprises 10 electoral divisions, with an area of 109,268 acres, and a population in 1851 of 44,049.

This consists mainly of a spacious and well-built street between the Avonachara and Rosboro rivers, terminating at each end in a bridge. In the town are a neat parish church, a Roman Catholic chapel and nunnery, a Free Church, a public library founded by Mr. R. C. Pritchard, 1335 scholars in 1852, two National schools, a court-house, a market-house, a bridewell, a fever hospital, and a distinct dispensary. There are also distilleries, breweries, con-
stores, and flour-mills. Vessels of 200 tons ascend to Ballylick, within half a mile of Milten — and at the port of Ballincurra, about a mile below the town, large shipments are made of corn and other provisions. Quarter and petty sessions are held in Milten. Milten was on May 14th, July 5th, October 10th, and November 22nd. The town and neighbourhood are the property of Viscount Milten.

MILBURN. [Somersetshire.]

MILITARY AND NAVAL FORCES. Under 'Great Britain,' in Penny Cyclopaedia, vol. xi., p. 420, the state of the army and navy of the United Kingdom, in 1858, was given. Since that period, partly in consequence of the deficiencies made apparent during the war against Russia, several important regulations have been introduced into the army. To the branches of the Artillery and the corps of Engineers, commissions were thrown open to competitive examination, with a marked success. After a certain time, not yet fixed (April, 1859), the first entrance to these corps is to be made at Sandhurst Military College, but it would appear that, with very slight restrictions, these corps, as well as staff appointments, will still be open to public competition. The competitors must not be less than 16, nor more than 18, years of age, they must have testimonials of responsibility, and they will have to be nominated by the Commander-in-chief, before they can be received for examination.

To the main body of the army facilities have been afforded for frequent fighting for the soldiers, and promotions from the ranks. The use of the Minie and Enfield rifles have been generally adopted throughout the army, and prizes have been instituted for the encouragement of skill in their use. Some alterations also have been made in the clothing and equipment of the soldiers, which, as far as they have gone, have been improvements, but which might be judiciously extended. A permanent camp was also formed at Aldershot, near Bagshot, in 1855, where field operations could be effectively performed, and another in Ireland. Also, in consequence of a medical report showing the fearful mortality in the army arising from sickness, an investigation was ordered, which resulted in showing that the main cause of a mortality which considerably more than doubled the average rate, and very much exceeded even that of the most deleterious and dangerous trades, was the ill-constructed and crowded state of the barracka. In March, 1858, General Peel, the Secretary for War, announced that surgeons had been appointed to examine the barracks, and that prompt means would be taken to remedy these evils.

The number of officers, non-commissioned officers, and rank and file, voted for the effective service of the United Kingdom for the year ending March 31, 1857, the close of the Russian war, was 24,757,150, exclusive of the 10,000 in the East Indies, who amounted to 30,263; the number of the non-effective service was 2,000; the estimated charge was 34,996,504l.; an increase of 30,373 men, and of 6,288,007l. of charge, over the preceding year. The revised estimate was subsequently reduced to 250,340,024l.

For the year ending March 31, 1858, there were voted 186,756 men, with 11,786 horses, a decrease of 119,920 men from the preceding year. The troops in the East Indies had been increased to 30,197, with 2,812 horses.

For the year ending March 31, 1856, the estimate was as follows —

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The amount voted for the year ending March 31, 1857-8, was 11,443,236l.; for 1858-9 it was 11,750,000l. Of this in the first year 4,380,017l., and in the last 4,361,057l. were expended on regimental and staff payments and allowances, but 800,000l. in the last year was to be paid by the East India Company on account of the excess of numbers sent to India.

The amount voted for the Embody Militia for the year ending March 31, 1859, was 650,000l. and for Volunteer Corps, 80,000l.; for 1858 the amount had been 58,829l.

The sum expended on the effective service in the army in 1857-8 was 9,221,360l.; the estimate for 1859-9 was 9,286,319l.; on the non-effective (pensions, rewards, and allowances), 2,291,675l. and 2,940,682.

In the Navy much attention has been given to instructing the seamen in the working of great guns. This has been eminently successful, and the precision and rapidity with which they can now be directed and discharged has added materially to their efficiency for destructive purposes.

In 1857 the total navy consisted of 260 sailing vessels, carrying 67,272 guns, and 205 steam vessels carrying 6,050 guns, besides 150 gun-boats. These were manned by 45,776 men, including officers, and there were in addition 16,000 marines.

In January 1858 there were in commission 645 vessels of various sizes, sailing and steam-propelled vessels, mounting 10,716 guns, and 130 steam-cum-sail-ship and 240 ships of war, 5 mounted 131 guns each, and 22 others mounted from 101 to 120 guns each. The arming of vessels has however undergone considerable modification, the chief objects aimed at now are facility of motion in the ships, and weight of metal and length of range.

The flag officers in active service in January 1858 numbered 21 admirals, 27 vice-admirals, 61 rear-admirals, 350 captains, 517 commanders, 1,105 lieutenants, 345 masters, 1,019 mates, 1,030 chargers, 127 engineers, 227 surgeons, 257 assistant-surgeons.

Of the Royal Marines there are 104 companies, of which the total strength is estimated at 15,000. They are commanded by 3 generals, 3 lieutenant-generals, 5 major-generals,
4 colonels commandant, 5 colonels and second commandants, 19 lieutenant-colonels, 120 captains, 176 lieutenants, and 88 second lieutenants. In the latter there are 304 officers of Royal Marine Artillery, with 1 colonel and second commandant, 2 lieutenant-colonels, 14 captains, 37 first lieutenants, and 9 second lieutenants.

In the Mediterranean on the navy for the year ending March 31, 1857, was 14,694,614, an amount less by 1,904,100 than that of the estimate of the gross amount. The vote for 1858-9 was for 44,380 seamen, including coast-guards, &c., and 15,000 marines; the estimate of the expendable was 70,900,000, including the effective and non-effective services.

The military and naval forces of the principal foreign countries for 1857 (where not stated to the contrary), are given as follows in the 'Oeche Almanach.'

*The Netherlands amounted to 55,565 men, of whom the infantry, including the staff, number 43,853 men; the cavalry 4490; the engineers 695; the artillery 8687; a corps of portoliers, numbering 213; and 3 cavalry regiments of Zouaves; in all, 19,965,298. There were altogether 332 guns; there were 2 ships of the line, 6 sailing and 14 steam frigates; there were 50 mortar and gun-boats, and other small vessels. The total population of the Two Kingdoms was 5,211,113, in 1856.*

*In Austria there were 56,495 men, the infantry, and 12,894 men, the artillery, altogether 59,389 men; there were 3 ships of the line, 4 frigates, and 2 gun-boats, and 14 steam-elephants. The number of gunners and engineers was 7,351.*

*The military forces of the United Kingdom of Italy amounted to 136,926 men, with 956 officers of artillery, and 1,265 engineers; there were also 9,700 men, veterans in retreat, and others, with a reserve of 12,000, making a total of 31,845 men. These were independent of 17,353 men, forming the armed forces of its foreign possessions. The navy consisted of 28 vessels, of which 5 were disarmed, and 6,116 men, lieutenants, and military engineers; there were also 3,964 men, veterans in retreat, and others, with a reserve of 4,966, making a total of 31,816 men. The following were the forces in the various countries:*
303 provincial guards in the Canaries; a total of 112,609 men, with 11,980 horses. There is also a corps of carabiniers consisting of 75 companies, of which 11 are cavalry, which form the frontier guard. There are likewise a considerable number of forces in Cuba, and other foreign possessions. The navy consists of 51 sailing ships, and 48 steam-vessels; there were 3 ships of the line, 10 frigates, ranging from 42 guns to 2 guns; 5 corvettes, 11 frigates, &c., the whole manning 1100 guns. There are also a large number of gun-boats, &c., with the total number of 144,013 men. The enrolled troops form 3 regiments of infantry, 2 of cavalry, and 3 of artillery, and number altogether 10,702 men, exclusive of officers; the cantioned troops of the rest of the part of their service total 7621 men; and the troops raised by conscription number 95,295 men. Norway had a military force of 11,924 infantry, 1070 cavalry, 1330 artillery, with 9160 of the landwehr. The navy possessed 897 vessels of various sizes, consisting of 703 officers' vessels, 450 cannon; of these 3 frigates, 4 corvettes, 122 gun-boats, &c. The maritime conscription amounted to 46,000 men. The united population of Sweden and Norway in 1855 was 5,076,058.

Of Switzerland the army consisted of 108,000 men, of whom 76,000 formed the regular army, and 32,000 the reserve. The regular army comprised 74 battalions of infantry, 43 companies of riflemen, 39 companies of cavalry, 40 companies of artillery, and 9 companies of engineers. The population of Switzerland in 1850 was 1,417,774.

Turkey had an army comprising 100,800 infantry, 17,300 cavalry, 7800 artillery, with 5300 additional in fortresses, 1600 engineers, 16,000 detached troops in Candia, Tripoli, and Tunis, which made the total number 68900 on a reserve of 128,680 men. The navy in 1853 comprised 70 vessels, manned with 34,000 seamen, and 4000 marines. The population of Turkey in 1844 (the latest taken) was 30,600,000.

With the peace establishment, 6149 infantry troops, 172 cavalry, and 1562 artillery, [engineers, &c., making a total of 9663 men; on a war establishment these can be raised to 22,016. The population of Wurtemberg in 1855 was 1,069,720.

The United States of America possessed an army composed of 1 corps of engineers, 5 regiments of cavalry, 4 regiments of artillery, and 10 regiments of infantry. The whole effective force was 16,502 men; but in addition, the militia number 54,000. At this date, this army consisted of 74 vessels, mounting 2244 guns. There were 10 sail of the line ranging from 120 to 84 guns; 13 frigates ranging from 60 to 60 guns, most of the guns of large calibre, and many of the vessels propelled by steam of most excellent construction. The population of the United States in 1850 was 37,601,708.

MILITARY PUNISHMENTS. The policy which has been pursued of late years in modifying the punishments prescribed by the military laws, and in throwing off the collar, has been extended to those which may be inflicted by courts martial for military offences. One material alteration consists in the limitation of corporal punishments; the utmost extent to which this could be carried has been described in a previous part of this work, which would it appear, cannot serve out of the kingdom except with the consent of Parliament (18 & 19 Vict. c. 1).

MILLER, HUGH, an eminent geologist. He was born at Cromarty, in the north of Scotland, on the 18th of October, 1802. He was descended from a humble family, who had been long known in the parish of Cromarty as sailors. His father became eventually possessed of a small vessel of his own, in which he was lost, whilst Hugh Miller was yet a child. In a short time he was sent to school, and began to show distinguished for his fondness for poetry and poetical composition. At this time he was a large reader, and placed under contribution the libraries of the parish. In this way he laid the foundation of an extended knowledge of literature, which availed him in after life. But the most important part of his education consisted in the natural history instruction he received from an uncle who had acquired a taste for the observation of natural phenomena. Whatever might have been his aspirations, he was obliged to content himself with learning the trade of a mason. This occupation, however unexpectedly fostered the taste he had acquired for the study of natural history; and whilst hewing blocks of stone in the quarry, he diligently studying the traces they exhibited of their past inhabitants. He then resolved to himself to become the historian of the Old Red-Sandstone, amongst the rocks of which he principally worked. His first literary efforts were not however directed to geology. He was early devoted to the muses, and was induced, by the failure of his first attempt to become a poet, to confine himself to writings of a more prosaic character. His other works, however, are suffices to publish a book of poetry. This work, though it failed to give him a position as a poet, drew towards him the attention of friends, which resulted in his giving up his mason's employment and becoming an owner of land in his native town. This appointment occupied him more leisure for literature. He became a frequent contributor to newspapers, more especially the 'Inverness Courier'; but his first distinct prose publication was entitled 'Scenes and Legends of the North of Scotland.' Although the subjects of this work was only of local interest, the purity of its style and the thought and feeling thrown into the subject discussed, made it a popular work, and several editions have been printed.

With naturally strong feelings, and a power of writing rapidly and impressively, it might be expected that a man in Mr. Miller's position would enter into the great discussion which terminated in a rupture of the Scotch church. His views were, however, by no means such as to enable him to take part in the discussions of the Scotch people to the Right Hon. Lord Brougham and Vaux, on the opinions expressed by his lordship in the Anchariterar case.' This letter, which was referred to by Mr. Gladstone in his 'Church Principles,' as the 'elegant and most magnificent,' was written in answer to a letter from Lord Brougham, upon the author the attention of the Free Church party. They had long felt the need of an organ, and the man had at length appeared who was capable of undertaking its conduct. The 'Witness' newspaper was started, and Mr. Miller was invited to accept its editorship. This paper was published twice a week, and conducted with great ability by Mr. Miller to the day of his death. Although never falling in the political and public departments, he found time to carry out the projects which he had so long entertained, and which were described in a series of papers in the 'Witness.' These papers excited the surprise and admiration of the geologists who assembled at the first meeting of the British Association in Glasgow in 1840. Sir Charles Lyell, Sir Roderick Murchison, and Dr. Buckland, were amongst those who admired his astonishment at the amount of new matter which was thus for the first time brought before them. Professor Agassiz, who was also present at this meeting, named one of the papers as the best he had ever read. After the death of Miller, after its discoverer. These papers were afterwards published in a volume, 'The Old Red Sandstone, or New Walks in an Old Field.' This work is written in a style remarkably pleasing, and treats of the great facts of geology in a peculiarly attractive manner, and will remains one of the most popular works on geology in the English language. Its scientific merit consists in the description of a number of new fossil forms of animals belonging to a formation which had, up to that time, been unknown.

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MILITATION, been regarded as almost destitute of the remains of animal life.

Mr. Miller had never visited England. He now made a journey to London, and with pen in hand made notes of what he saw and felt. These notes he published on his return under the title of 'First Impressions of England and Its People.' This work has also been admirably compressed, and is entitled, 'Vestiges of the Natural History of Creation,' was published in 1844, which excited much attention, and not least in the religions world. The discovery of a fish and a plant in the old red sandstone furnished Mr. Miller with arguments against the views of the author of the 'Vestiges.' These he embodied in a work entitled 'Footprints of the Creator, or the Astrogeology of Stromness.' It embraced a general view of the natural history of creation, and is regarded as an able exposition of the views of a most distinguished point of view. Like the author's other works it has had a large circulation.

Mr. Miller also published other works and papers on geology. In 1848 he published 'The Geology of the Bass.' At the meeting of the British Association at Edinburgh in 1840 he read a paper on "certain peculiarities of structure in some ancient Ganoidea (Fish)." At the meeting of the Association at Glasgow in 1855 he gave an elaborate account of the Fossil Flora of Scotland. He also lectured in Edinburgh on geological subjects. Mr. Miller's death was sudden and very startling. On the morning of the 24th of December, 1866, he was found dead in his room, shot through the body, and under circumstances which left no doubt that he died by his own hand. He had been lately engaged in writing his editorial labours, at a work called 'The Testimony of the Rocks,' and his brain, already diseased, had become strongly excited. An old habit, that of sleep-walking, bad returned upon him. He had, through fear of robbers, kept a loaded pistol in his room; and with this pistol, in a paroxysm of his disease, he put an end to his life. The work which he had thus completed on the day preceding his death, was shortly afterwards published, and had a large sale.

Mr. Miller's death caused a most painful excitement. Few men have occupied a higher position in the estimation of his countrymen. He was a noble example of what self-education can do for a man, and whether regarded as the fearless and independent writer, or the man of literature and science, his character must claim the respect and admiration of posterity.

MILLER'S THUMB. [COTTONUS.]

MILTHORPE, OR MILNTHORPE. [WESTMORELAND.]

Milkweed. [Asclepias垒.

Mr. Birket was born in 1776. He received a good education, became particularly skilful in mathematics, and acquired an extensive knowledge of languages. When about forty years of age he was appointed an actuary of the Sun Life Assurance Office, a situation in which he continued for upwards of thirty years. His 'Treatise on Annuities,' published in 1815 in 2 vols. 8vo, is one of the universally-acknowledged authorities on the subject of life assurance, for the calculations of which he invented and described a new system of notation. Mr. Milne had also paid some attention to botany, and was said to have possessed one of the best botanical libraries in London. His uniform courtesy gained him general esteem, and his information and assistance were readily given wherever they might serve a useful purpose. He died Jan. 4, 1851, having unfortunately become mentally incapacitated for fulfilling his official duties a few years earlier.

MILTON ABBAS. [Dorsetshire.]

MIMOSA, a genus of Plants belonging to the natural order Leguminosae. It has polygamous flowers; petals 4 or 5, connected together into a 4- or 5-cleft funnel-shaped corolla; stamens inserted in the base of the corolla; or in the stipe of the ovary. In the petals of the corolla, equal in number to the lobes of the corolla, or double or triple that number; legume-compressed, flat, 3- or many-jointed; joints one-seeded; ribs permanent; stipules petiolar; leaves bipinnate, with one or more pairs of pinnae, each pair of which is perforated by a number of pairs of hair-like hairs compressed or white, dotted, or pinnately cleft. The leaves are frequently sensitive to touch, as in the Sensitive Plant. The species are very numerous.

M. sensitiva, the Sensitive Plant, has prickly stems and petioles, and is dotted, when patted, but not glabrous above. It is a native of Brazil. The flowers are rose-coloured and tetraspermous. The leaves are sensitive to touch, but not so much so as the following species.

M. pudica has a prickly herbaceous stem, with the petals and peduncles more or less beest with stiff hairs or bristles; leaves somewhat digitately pinnate, with 4 pinnae, each pinna bearing many pairs of linear leaves. It is a native of Brazil. The flowers are of a very delicately fragrant, and it is found in gardens under the name of Sensitive Plant, the leaves falling on the slightest touch. The roots of this plant and its allies emit an offensive smell, resembling the odour of a sewer at the time of impending rain. The legumes of M. saponaria, a considerable article of commerce in India on account of their saponaceous qualities. [SENSITIVE PLANTS.]

MIMOTOMIC ACID. [CHEMISTRY. S. 2.]

MIMUS, a genus of Plants belonging to the natural order Sapotaceae. It has a cinch 6- to 8-parted; segments disposed in a twin order; corolla with a double row of segments; fruit with 20 segments of which are either entire or divided, the inner row containing 6 or 8 entire segments; antheriferous stamens 6 or 8, opposite the inner segments of the corolla, alternating with many sterile ones; ovatum 6- to 8-celled; berry 1- to 2-seeded; fruitlets are elliptic or orbicular, quite-enlarged glabrous coriaceous leaves, and axillary fascicles of 1-flowered pedicels. The flowers are small and white; the fruit edible.

M. Ellioti has ovate-lanceolate or oblong leaves, acuminated, glabrous; pedicels many together, shorter than the petals, which are glabrous. It is a native of the East Indies, where it is much planted on account of its fragrant flowers, which come out chiefly in the hot season. A fragrant water is distilled from the flowers. The seeds yield an abundance of oil in request for painters. The leavers are said to produce an extraordinary noise when bruised.

M. Kagi has ovate leaves, very blunt, silvery or hairy beneath, hardly three times as long as the petioles, corolla 12-lobed, with 12 corolla filaments, touching the leaves and frequently sensitive to touch, as in the Sensitive Plant. The species are very numerous.

MINERALOGY, according to the definition given by Kirwan, is the art of distinguishing mineral substances from each other. It may be regarded both as a science and an art. As a science, in reference to the knowledge requisite in supplying accurate descriptions of minerals, and forming what may be termed a natural classification; and as an art, in reference to the arrangement of the descriptive character for the purpose of afterwards distinguishing minerals from each other.

Mineralogy then must be considered as including the
The chemical composition of bodies, and an account of their external or physical properties. Both are requisite, for substances occur which agree in their chemical composition, and exhibit differences in their external characters; while there are other bodies which differ in their chemical constitution, but agree in their external properties.

Various methods of arrangement of minerals have been proposed by different authors. According to Werner, minerals were divided into the four classes of earthy minerals, saline minerals, inflammables, and metals; Karsten classed them under the heads of earths, salts, combustibles, and metals; Hauy divided minerals into scidiform earthy substances, earthy substances, non-metallic combustible bodies, metallic bodies, and substances not sufficiently known to admit of classification, rocks, and volcanic products. In Phillips's 'Elements of Mineralogy,' the classes are earthy minerals, alkaline-earthy minerals, acids, acidiferous earthy minerals, acidiferous alkaline minerals, native metals, metaliferous minerals, and combustible minerals. Beralius attempted a strictly chemical classification of minerals: he has, however, candidly admitted that considerable difficulties attend this method, owing, in part, at least, to the uncertainty which exists as to what are the essential and what the accidental constituents of a mineral.

The following is the arrangement of Dufrenoy, as given in Professor Ansted's 'Elementary Course of Geology':—

Class I.—Simple bodies, or Binary Compounds never bases, generally essential ingredients in combinations, and serving as proximate elements.


Class II.—Alkaline Salts.

Group 1. Salts of Ammonia. 2. Salts of Potash.

Class III.—Alkaline Earths, and Earths.


Class IV.—Silicates.

Group 1. Anhydrous Aluminous Silicates.

1. Hydrous Aluminous Silicates.

2. Silicate of Alumina and Lime, or their isomorphs.

3. Aluminous and Alkaline Silicates, and their isomorphs.

4. Hydrous Aluminous Silicates with Alkaline and Base, and their isomorphs.

5. Non-aluminous Silicates.

a. With Lime as a base.

b. With Zinc as a base.

c. With several bases.

7. Silico-Alumina.

8. Silico-Fluorites.


10. Silico-Titanates.

11. Silico-Sulphates.


Class V.—Metals.


11. Arsenic. 27. Gold.


13. Titanium. 29. Iridium.


Dana, in his useful 'Manual of Mineralogy,' adopts the following classification:

Class I.—Gases; consisting of or containing Nitrogen or Hydrogen.

Class II.—Water.

Class III.—Carbon, and Compounds of Carbon.

Class IV.—Sulphur.

Class V.—Haloid Minerals: Compounds of the Alkalies and Earths with the Soluble Acids, or of their Metals with Chlorine or Fluorine.


Class VI.—Earth Minerals: Silica and Siliceous or Aluminous Compounds of the Alkalies and Earths.


5. Natron. 10. Alumina.

Class VII.—Metals and Metallic Ores.


We have already observed that Mineralogy includes a knowledge of the chemical composition and of the external and physical properties of minerals, and they are all divisible into two great classes of crystallised and uncrystallised. With respect to regularly crystallised minerals, we refer for an account of their forms to what is stated under Crystallography. There are some substances which do not assume regular forms, but have an imperfect crystalline structure; while those bodies which are not either crystallised or crystalline, unless they are pulverulent, are described as massive, and these are subdivided into such as possess particular forms, as botryoidal, mammillated, nodular, stalactic, reniform, globular, and amorphous, or without any particular form.

The structure of minerals is an important feature. It may be Columnar, Lamellar, or Granular. The following are explanations of the terms used in describing the different kinds of columnar structure:—

Fibrous: when the columns are minute and lie in the same direction, as gypsum and asbestos. Fibrous minerals very commonly have a silky lustre; a fibrous variety of gypsum, and one of calc-spar have this lustre very strongly, and each is often called satin-spar.

Reticular: when the fibres, or columns, cross in various directions, and produce an appearance having some resemblance to a net.

Stellated: when they radiate from a centre in all directions, and produce a star-like appearance. Stibite and gypsum are examples.

Radiated divergent: when the crystals radiate from a centre without producing stellar forms. Examples, quartz, gray antimonite.

In the Lamellar Structure the laminae or leaves may be thick, or very thin; they sometimes separate easily, and sometimes with great difficulty. When the laminae are thin and separate easily, the structure is said to be Foliated. Mica is a striking example, and the term Micaeous is often used to describe this structure. When the laminae are thick, the term Tabular is often applied; quartz and heavy spar afford examples. The laminae may be elastic, as in mica, flexible, as in talc, or graphite, or brittle, as in diaphragm. Small laminae are sometimes arranged in stellar shapes; this occurs in mica.

When the grains in the texture of a mineral are coarse, it is said to be Coarsely Granular, as in granular marble; when fine, Finely Granular, as in granular quartz; and if no grains can be detected by the eye, the structure is described as Impalpable, as in chalcedony. Granular minerals, when easily crumbled by the finger, are said to be Friable.

Massive minerals also take certain imitative shapes, not peculiar to either of these varieties of structure. The following terms are used in describing imitative forms:

Globular: when the shape is spherical or nearly so; the structure may be Columnar and Radiating, or it may be Concentric, consisting of coats like an onion. When they are attached, they are called Implanted Globules.
Reniform: kidney-shaped. In structure, they are like globular shapes.

Botryoidal: when a surface consists of a group of rounded protuberances. The prominences or globules usually consist of fibres radiating from the centre.

Mammillary: resembling the botryoidal, but consisting of larger prominences.

Pillow: like a thread.

Angular: slender like a needle.

Stalactitic: having the form of a cylinder or cone hanging from the roofs of cavities or caves. The term stalactite is usually restricted to the cylinders of carbonate of lime hanging from the roofs of caves; but other minerals are said to have a stalactitic form when resembling these in their general shape and origin. Chalcedony and brown iron-ore are often stalactitic.

Reticulated: net-like.

The lustre of a surface is said to be drusy when covered with minute crystals.

Amorphous—shapeless: having no regular structure or form, either crystalline or amorphous.

Crystals are also called Pseudomorphs. A pseudomorphous crystal is one that has a form which is foreign to the species to which the substance belongs.

Crystals sometimes undergo a change of composition from aqueous or some other agency, without losing their form; for example, a crystal of carbonate of lime changes toGypsum, still retaining the octahedral form. Cubes of pyrites are changed to red or brown iron-ore.

Again, crystals are sometimes removed entirely, and at the same time and with equal progress, another mineral is substituting its place. This is an example of the change of one mineral into another, when the laws of crystal-structure are transferred to quartz. The petrifaction of wood is of the same kind.

Again, cavities left empty by a decomposed crystal are filled by another species by infiltration, and the new mineral takes on the external form of the original mineral, as a fused metal the form of the mould into which it is cast.

Again, crystals are sometimes incrusted over by other minerals, as cubes of flour by quartz; and when the floor is afterwards dissolved away, as sometimes happens, hollow cubes of quartz are left.

The first kind of Pseudomorph are Pseudomorphs by Alteration; the second, Pseudomorphs by Infiltration; the third, Pseudomorphs by Incrustation.

Pseudomorphous crystals are distinguished by having a different structure and cleavage from that of the mineral imitated in form, and a different hardness, and usually little lustre.

A large number of minerals have been met with as pseudomorphs. The causes of such changes have operated very widely and produced important geological results.

The lustre of minerals depending on light are also arranged. They are of five kinds, and arise from the power of minerals to reflect, transmit, or emit light. They are as follows:—1. Lustre; 2. Colour; 3. Diaphanity; 4. Refraction; 5. Phosphorescence.

The lustre of minerals depends on the nature of their surfaces, which causes more or less light to be reflected. There are different degrees of intensity of lustre, and also different kinds of lustre.

The kinds of lustre are six, and are named from some familiar object or class of objects:

Metallic: the usual lustre of metals. Imperfect metallic lustre is expressed by the term Sub-Metallic.

Vitreous: the lustre of broken glass. An imperfect vitreous lustre is termed Sub-Vitreous. Both the vitreous and in-vitreous lustres are common. Quartz possesses the former in an eminent degree; calcareous spar often the latter. This lustre may be exhibited by minerals of any colour.

Resinous: lustre of the yellow resins. Opaque and zine-blende are examples.

Pearly: like pearl. Talc, native magnesium, stibnite, &c., are pearly. When combined with sub-metallic lustre, the term Metallic-Pearly is applied.

Silky: like silk; it is the result of a fibrous structure. Fibrous carbonate of lime, fibrous gypsum, and many fibrous minerals, more especially those which in other forms have a pearly lustre, are examples.

Adamantine: the lustre of the diamond. When sub-metallic, it is termed Metallic-Adamantine. Varieties of white lead-ore are examples.

The degrees of intensity are denominated as follows:—

1. Specular: the surface reflects light with great brilliancy, and gives well defined images. Elba iron-ore, tin-ore, some specimens of quartz and pyrites are examples.

Shining: when an image is produced, but not a well-defined one. Nearly all the less transparent and less refractive minerals are shining. Glistening: when there is a general reflection from the surface, but no image. Talc and copper-pyrites are examples.

Glimmering: when the reflection is very imperfect, and the light is scattered and diffused over the surface. Flat and chalcedony are examples.

A mineral is said to be Dull when there is a total absence of lustre, as chalk.

In distinguishing minerals, both the external colour and the contiguous place that has been rubbed or scratched, are observed. The latter is called the streak, and the powd er abraded, the Streak-Powder.

The colours are either metallic or non-metallic.

The Metallic are natural and of some familiar metal, as copper-red, bronze-yellow, brass-yellow, gold-yellow, steel-grey, lead-grey, iron-grey.

The Non-Metallic used in characterising minerals, are various shades of white, gray, black, blue, green, yellow, red, &c.

There are thus snow-white, redish-white, greenish-white, milk-white, yellowish-white; bluish-grey, smoke-grey, green-grey, pearl-grey, ash-grey; velvet-black, greenish-black, bluish-black, amethyst-blue, violet-blue, sky-blue, indigo-blue, emerald-blue, turquoise, blue-green, blackish-grey, pistachio-grey (yellowish); sulphur-yellow, straw-yellow, wax-yellow, ochre-yellow, honey-yellow, orange-yellow; scarlet-red, blood-red, flesh-red, brick-red, hyacinth-red, rose-red, cherry-red; hair-brown, reddishbrown, chestnut-brown, yellowish-brown, pinchbeck-brown, wood-brown.

The expression a Play of Colours is used when several prismatic colours appear in rapid succession on turning the mineral. The diamond is a striking example; also precious opal.

Change of Colours: when the colours change slowly or turning in different positions, as in labradorite.

Opalescence: when there is a milky or pearly reflection from the interior of a specimen, as in some opals, and in cat's eye.

Iridescence: when prismatic colours are seen within a crystal; it is the effect of fracture, and is common in quartz.

Tarnish: when the surface-colours differ from the interior; it is the result of exposure. The tarnish is described as frieze, when it has the hues of the rainbow.

Polychoiroism: the property belonging to some prismatic crystals of presenting a different colour in different directions. The term Dichroism has been generally used, and implies different colours in two directions, as in the mineral lollite, which has been named dichroite because of the different colours presented by the bases and sides of the prism. Mica is another example of the same. The more general term has been introduced, because a different shade of colour has been observed in more than two different directions.

These different colours are observed only in crystals with unequal axes. The colours are the same in the direction of equal axes, and often unlike in the direction of unequal axes.

This is the general principle at the basis of polyichroism.

Diaphanity: the property which many objects possess of transmitting light; or in other words, of permitting more or less light to pass through them. This property is often called transparency, but it is properly one of the degrees of diaphanity. The following terms are used to express the different degrees of this property:

Translucent: a mineral is said to be translucent when the outlines of objects, viewed through it, are distinct. Glass and crystals of quartz are examples.

Sub-Translucent, or Semi-Transparent: when objects are seen, but their outlines are indistinct.

Amphible: light is transmitted, but objects are not seen. Leaf-sugar is a good example; also Carrara marble.

Sub-Translucent: when merely the edges transmit light faintly. When no light is transmitted, the mineral is described as opaque.
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Those minerals whose faces emit light exhibit two sets of phenomena, Refraction and Polarisation. The index of refraction has been obtained for many minerals, of which the following are a few:

- Air: 1.000 Calc-Spar: 1.554
- Tabusheer: 1.711 Spinel: 1.739
- In: 1.355 Sapphire: 1.794
- Cryolite: 1.349 Garnet: 1.815
- Water: 1.330 Zircon: 1.961
- Fluor-Spar: 1.434 Blende: 2.263
- Rock-Crystal: 1.523 Diamond: 2.430
- Quartz: 1.546 Chromate of Lead: 2.974

Many crystals possess the property of refracting light in two directions instead of one, and objects seen through them consequently appear double. This is called Double Refraction. It is most conveniently exhibited with a crystal of calc-spar, and was first noticed in a polished variety of this mineral from Iceland, called from the locality Iceland-Spar. On drawing a line on paper and placing the crystal over it, two lines are seen instead of one—one by ordinary refraction, the other by an extraordinary refraction. If the crystal, as it lies over the line, be turned around, when it is in one position the two lines will come together. Instead of a line make a dot on the paper, and place the crystal over the dot: the two dots seen will not come together on revolving the crystal, but will seem to revolve one around the other. The separation is greatest when the crystal is cut in every direction except that of the vertical axis, and this direction is called the Axis of Double Refraction. To view it in this direction the ends must be ground and polished. The divergence increases on passing from a view in the direction of this axis to one at right angles to it, which is the greatest. In some substances the refraction of the extraordinary ray is greater in the latter direction than that of the ordinary ray, and in others it is less. In calc-spar it is less, it diminishing from 1.5445 to 1.5538. The former is said to have a Negative Axis, the latter a Positive.

This property of double refraction belongs to such of the fundamental forms as have unequal axes; that is, to all except those of the isometric system, in which the lateral axes are equal (the dimetric and hexagonal systems) have one axis of double refraction; and those in which they are unequal (the triclinic, monoclinic and triclinic systems), have two axes of double refraction.

Both rays in the latter case of extraordinary refraction. In nitre the two axes are inclined about 5° to each other; in aragonite 18° 18'; in topaz 65°. The positions of the axes taper vary widely in different minerals.

The diamond is a peculiar mineral, that possesses, besides the ordinary property of light, termed Polarisation. Viewed by means of another doubly-refracting crystal, or crystalline plate (called from this use of it an analysing plate), the ray of light becomes alternately visible and invisible as the latter plate is revolved. If the double refraction be greatly increased, the two rays are seen of the same substance, and when viewed in the manner stated, rings of prismatic colours are developed, and on revolving the analysing plate the coloured rings and intervening dark rings successively change places.

Several minerals give out light either by friction or when gently heated. This property of emitting light is called Phosphorescence.

Two pieces of white sugar struck against one another give out a light which may be taken in a dark place. The same effect is obtained on striking together fragments of quartz, and even the passing of a feather rapidly over some specimens of zinc-blende is sufficient to elicit light.

Fluor-spar is the most convenient mineral for showing Phosphorescence by Heat. On powdering it, and throwing it on a shoed heated nearly to redness, the whole takes on a bright glow. In some varieties the light is emerald-green; in others purple, rose, or orange. A massive flour from Huntington, Connecticut, shows beautifully the emerald-green fluorescence when viewed in the dark.

Some kinds of white marble, treated in the same way, give out a bright yellow light. After being heated for a while the mineral loses its phosphorescence; but a slight jar will cause it again.

Some minerals become electrified on being rubbed, so that they will attract cotton and other light substances: and when electrified some exhibit positive and others negative electricity when brought near a delicately suspended magnetic needle. The diamond, whether polished or not, always exhibits positive electricity, while other gems become negatively electrified in the rough state, and positive only in the polished state. First one of a feather is sufficient to excite electricity in some varieties of bende. Some minerals thus electrified retain the power of electric attraction for many hours, as tops, while others lose it in a few minutes.

Many minerals become electric when heated, and such species are said to be Pyro-Electric.

If a prism of tourmaline, after being heated, be placed on a delicate frame, which turns on a pivot like a magnetic needle, on bringing the needle near it, or under proximity with the prism, it will be attracted, the other repelled, thus indicating the polarity alluded to. Several other minerals exhibit electrical phenomena, especially borosrite and tops, which, like tourmaline, are bimetallic in their modifications.

Magnesium is exhibited more especially in the ores of iron. The loadstone, as the magnetic oxide of iron is called, is common where the ores of iron are found. When mounted like a horse-shoe magnet, a good loadstone will lift a weight of many pounds. This is the only mineral that has decided magnetic attraction; but several crystals containing iron are attracted by the magnet, or, when brought near a magnetic needle, will cause it to vibrate; and moreover, the metals nickel, cobalt, manganese, palladium, platinum, and osmium, have been found to attract magnets.

Minerals vary in their specific gravity. This must be ascertained for other substance. [Specifie Gravitt.] The Hardness of minerals differs much, and is the point first attended to by the mineralogist. In order to ascertain the hardness of a mineral it is only necessary to draw a file across the specimen, or to make trials of scratching one with another. As standards of comparison, the following minerals have been selected, increasing gradually in hardness from the talc, which is very soft and easily scratched with a knife, to the diamond which nothing will cut; this table is called the Scale of Hardness:

1. Talc, common foliated variety.
2. Rock-Salt,
3. Calc-Spar,
4. Fluor-Spar, crystallised variety.
5. Apatite, transparent crystal.
6. Felspar, cleavable variety.
7. Quartz, transparent variety.
8. Topaz, transparent crystal.
9. Sapphire, cleavable variety.
10. Diamond.

If on drawing a file across a mineral it is impressed as easily as felspar, which is said to be 1; as easily as talc, which is said to be 4; if as easily as felspar, the hardness is said to be 6; if more easily than felspar, but with more difficulty than apatite, its hardness is described as 5 or 5.5.

The file should be run across the mineral three or four times, and each time it should be taken to make the trial on angles equally blunt, and on parts of the specimen not altered by exposure. Trials should also be made by scratching the specimen under examination with the minerals in the above scale, as sometimes, owing to a loose aggregation of particles, the file wears down the specimen rapidly, although the particles are very hard.

Minerals differ in their state of aggregation. Solid minerals may be—

Brittle: when parts of the mineral separate in powder on attempting to cut it.

Sectic: when thin pieces may be cut off with a knife, but the mineral pulverises under a hammer.

Malleable: when slices may be cut off with a knife, and the mineral pulverses under a hammer.

Flexible: when the mineral will bend, and remain bent after the bending force is removed, as talc.

Elastic: when after being bent it will spring back to its original position, as calc-spar.

A liquid is said to be Viscous when on pouring it the drops lengthen and appearropy, as petroleum.

When a mineral is broken its cut surface presents different aspects. The following are the several kinds of fracture in minerals—

Conchoidal: when the mineral breaks with a curved or concave and convex surface of fracture. Flint is a good example.
Even: when the surface of fracture is nearly or quite flat. Uneven: when the surface of fracture is rough with numerous small elevations and depressions.

But when the elevations are sharp or jagged, as in broken iron.

Soluble minerals may have taste: the kinds are—
Astringent: of taste of vitriol.
Sweetish-astringent: the taste of alum.
Sour: taste of sulphuric acid.
Bitter: taste of Epsom salts.
Alkaline: taste of soda.
Cooking: taste of salt petre.

When obtained from the rolling tributaries of Minnesota, with the waters of Lake Superior, and other waters having a rolling course, it is obtained by friction and more distinctly by means of the blow-pipe from several arsenical ores.

Horse-Radish odour: the odour of decaying horse-radish. It is the odour of burning selenium, and is strongly perceived when ores of this metal are heated before the blow-pipe.

Phosphorescent oddour: odour of burning sulphur. Friction will elicit an odour, and have it from many sulphurites.

Feld: the odour of rotten eggs or sulphuretted hydrogen. It is elicited by friction from some varieties of quartz and limestone.

Argillaceous, the odour of moistened clay. It is given off by loosening and shaking the allied minerals when breathed upon. Others, as pyrraloglise, afford it when heated.

Without submitting the mineral to a regular analysis, advantage is often taken of the effects of heat by means of the blow-pipe, with or without the aid of certain fluxes, as soda, phosphoric salt, &c.; and the result is stated to be either fusible, or with the assistance of different fluxes, and the nature of the resulting compound is described; sometimes it is a colourless glass, at other times coloured, translucent, &c. [Show the...]

(Dana, Manual of Mineralogy; Dana, A System of Mineralogy; Asied, Elementary Course of Geology, Mineralogy, &c.; Phillips, Introduction to Mineralogy; Phillips, Elements of Mineralogy; Jackson, Minerals and their Uses; Severn, Popular Mineralogy.)

MINNESOTA, a Territory of the United States of North America, lies between 43° 30' and 49° 22' N. lat., 90° 0' and 108° 30' W. long. It is bounded E. by the State of Wisconsin, N. by British North America, W. by the Territory of Nebraska, and S. by the State of Iowa. The area is 141,539 square miles. The population in 1856 was estimated at 160,000.

The surface of this Territory has generally the character of a rolling tableland; but there are considerable exceptions. Towards the eastern side it runs into a ridge of lofty hills, which traverses a large portion of it in a north-east and south-west direction. From a short distance above the Falls of St. Anthony, on the Mississippi, there extends southward a vast forest region for 120 miles, with a breadth ranging from 15 to 40 miles. The northern and north-eastern portion of the Territory is sometimes termed the 'region of lakes,' from the great number of lakes of various sizes which lie along the upper course of the Mississippi and its tributaries; and for some distance below this region the Mississippi traverses a swampy country.

The Territory is in every part abundantly watered. The Mississippi, lying within its boundaries in Lake Itasca; and belong wholly to it down to the confluence of the St. Croix, after which, to the southern boundary of the territory, it belongs equally to Minnesota and Wisconsin. This part of its course is described under Mississippi River. The principal tributaries which join it in this territory are the St. Croix, which separates Minnesota from Wisconsin, and the Minnesota, a large and broad stream, which rises near the centre of the Territory, flows through Big Stone Lake, and then flows generally south-west, bounding its windings of some 800 miles, first south-east, then south, and finally north-east, falls into the Mississippi at Fort Snelling. The Mississippi is navigable in Minnesota by steam-boats during seven months of the year; the other five months it is, with its tributaries, closed by ice. The Missouri, with its tributary, the White Earth River, forms the western boundary of Minnesota; it is navigable by steam-boats throughout Minnesota. It is joined by several small feeders, but by none of any consequence in this Territory. The Red River, which flows northward to Winnipeg Lake in British America, has its source in, and belongs for a considerable distance to Minnesota, and has numerous tributaries in this part of its course. The Big Sioux and several other rivers have also their upper courses in this Territory. The Mississippi, Minnesota, and St. Croix rivers, with Lake Superior, afford great commercial facilities: while the numerous smaller streams and lakes afford like facilities for agricultural and manufacturing operations. The principal lakes are the Itasca, Cass, Red, Leech, Devil, Oussulait, Big Stone, and Pepin. Besides these, there are 3,500 others.

As regards its geological character, the larger half of the country, including the centre and north-eastern portions, appears to belong to the igneous and metamorphic formations. In the northern and southern portions are considerable tracts of Lower Silurian rocks. Extending from the central eastward to Lake Superior is a narrow band of New Red Sandstone, with dykes of copper trap. The Missouri though its whole course in Minnesota appears to flow through erratic rocks, which are bordered on the east by tertiary formations. Copper- and lead-ores are said to have been found.

The climate, though severe, is not subject to rapid or extreme variations. The winters are in general rather mild, and the dryness of the air during winter, the coldest weather is endurable. A great quantity of snow falls in the winter, but generally there is not much moisture. The soil over a country so vast in extent, and having such different lithological features, is generally fertile; but it is found to be remarkably fertile, and the mould is of unusual depth. Most of the cereals appear to flourish: maize, oats, and wheat are the crops most cultivated, but rye, barley, and buckwheat are also grown. Potatoes, peas, and beans are raised to some extent. The land is well adapted for raising stock. There are at present no manufactures in the Territory. The chief occupation is the cutting and preparing of pine lumber, much of which is returned to home consumption, but the larger portion is sent to St. Louis.

At the census of 1850 Minnesota was divided into nine counties. The political capital is St. Paul, the only place which can as yet fairly rank as a town; but Pembina on the right bank of the Red River, having the first appearance of the territory—Fort Snelling, at the confluence of the Mississippi with the Mississippi—and Stillwater, on the west side of St. Croix Lake, are places of growing local importance.

St. Paul, the capital, occupies a commanding position on the left bank of the Mississippi, 15 miles below the Falls of St. Anthony, in 44° 52' N. lat., 93° 4' W. long. The first trading house was built here in 1842, it having previously been the winter station of the canoe traders of the St. Marys. It now contains a state-house 139 feet long, a court-house, jail, nine churches, schools, numerous hotels, stores, an inns, foundry, agricultural implement factories, flour-mills, &c. The streets are traversed by coaches and omnibuses; and whilst the river is free from ice, steam-vessels arrive and sail daily, although the vicinity of the town is still a wilderness. In 1850 St. Paul had 1135 inhabitants; in the spring of 1853 it is said to have had above 2000.

Minnesota has a legislature consisting of a 'Council and House of Representatives.' By the constitution, as framed by the territorial legislature, citizenship is not limited to whites, but extended to all persons of a mixture of white and Indian blood who shall have adopted the habits and customs of civilized men. Minnesota was erected into a Territory by Act of Congress in March 1849; that portion of it west of the Mississippi having previously formed a part of the Territory of Iowa, and that part east of the Mississippi having belonged to the Territory of Wisconsin. On 29th February, 1853, this Act was passed by Congress, authorising Minnesota to form a State government. This Act makes an alteration in the area of Minnesota, and consequently in the population. The Convention for forming the State was held at St. Paul in 1856; but the particulars have not yet (April 1, 1868), reached us.

(Statistical Gazetteer of the United States; Seventh Census of the United States; American Almanac, 1854; Owns Report of a Geological Survey of Wisconsin, Iowa, and Minnesota; Marcus, &c.)
MIRIAMICHI. [New Brunswick.]

MIRBEL, BRISEAU-C., a French naturalist, more especially distinguished for his knowledge of botany. He was born on the 27th of March 1776. He was appointed professor of botany in Paris in 1801, and one of his earliest published works was the introduction to his course. The subject was the influence of the study of natural history on the civilisation of man. He was associated with others in the production of the volumes on the general and special history of plants, in the series of works in continuation to the Systema Naturae. In this work he extended to eighteen volumes, the first, second, fourth, fifth, and sixth, were written by Mirbel. In 1802 he published his treatise 'On Vegetable Physiology.' He was also associated with Leopold Link, physician, botanist, and botanic historian, of the History of Plants, which was published in 1803. He subsequently, in answer to views put forth by Link, wrote an 'Exposition of the Theory of Vegetable Organization,' and also a defence of this work in 1808. In 1813 he published his 'Elements of Vegetable Physiology and Botany.' This work was published in three volumes, and was an admirable exposition of the state of vegetable physiology at the time it was published, and contained the result of numerous observations on the structure, functions, and development of plants. In 1835 he published a paper on the bark of dicotyledonous trees, in which he gave an admirable account of the structure of the bark in exogenous plants. After this he published a celebrated paper on the 'Anatomy of the Cell, and its Filaments,' in which he not only described the general structure of the plant, but the history of the development of its embryo. In his general theoretical views and numerous exact observations, Mirbel exercised a great influence on the progress of the science of botany during the first half of the 19th century. He died September 12, 1854.

MITCHELL, SIR THOMAS LIVINGSTONE, Knt., was born in 1792, at the residence of his father, John Mitchell, Esq., of Craigend, in Stirlingshire, Scotland. The name of Livingstone is thus associated with the history of the kingdom, as his father married the heiress of the line of Livingstone, Esq., of Haining, lord to Viscount Kilsyth, who was attained in 1716. Thomas Livingstone Mitchell entered the British army in Portugal in 1808, and served on the staff till the termination of the Peninsular War, when he had attained the rank of major. In the course of this service he had distinguished himself so much as to attract the attention of the late Sir George Murray, upon whose recommendation he was sent to the Cape of Good Hope as deputy surveyor-general of New South Wales under Mr. Oxley, whom he succeeded as surveyor-general—an office which he retained till his death. Besides performing the ordinary duties of this important situation, he conducted four expeditions into the interior, and was one of the most successful of the explorers of the Australian continent. Three of these expeditions were performed in the years 1831-32, 1835, and 1836. The first was in search of an imaginary river on the east coast of Australia, and his party resided among the aborigines, described as having a north-west course, and entering the sea; and the result of the journey was the discovery of the Peel River and the Namoi. The second expedition was for the purpose of exploring the course of the river Darling, and was continued in the third expedition, when the Darling was traced to its junction with the river Murray. Australia Felix was also discovered, and the Gienmel was explored to its entrance into the sea. These expeditions were made with great danger from the occasional hostility of the native tribes, and from their insidious and treacherous warfare, combined with the steadiness and resolution of an experienced leader. Major Mitchell published in 1838 his account of these journeys, under the title of 'Three Expeditions into the Interior of Australia.' He published also 'Descriptions of the recently-explored Region of Australia Felix, and of the present Colony of New South Wales,' 2 vols. 8vo, London, illustrated with lithographic drawings and woodcuts. He had a short time previously published his 'Map of the Colony of New South Wales, compiled from actual Measurements with the Chain and Circumferentor, and according to a Trigonometrical Survey, in Three Sheets.' Major Mitchell came to England for the purpose of superintending these publications, and, before his return, received in 1839, the honour of knighthood from the queen, and the title of D.C.L. from the University of Oxford. He was also elected a Fellow of the Royal Society and of the Geological Society.

Sir Thomas Mitchell's fourth and last expedition was commenced in December 1845, and terminated in December 1846. His account of it was published in 1848, under the title of a 'Journal of an Expedition into the Interior of South Australia, to the Barrier of South Australia, and Gulf of Carpentaria, by Lieut.-Colonel Sir T. L. Mitchell,' 8vo, illustrated with lithographic engravings and maps. This expedition did not reach the Gulf of Carpentaria, having been compelled to return in consequence of the loss of the cattle and horses from drought and want of pasture; but advanced as far as 21°30' S. lat. Sir Thomas Mitchell himself was the first to discover the important river which he named the Victoria, and saw it taking a north-west course, in a direction near to the bar of the Gulf of Carpentaria. Mr. Kennedy, however, Sir T. Mitchell next sent out the largest party of all his journeys in 1847, found that the river makes a great bend to the south-west, and he traced its course in that direction as far as 26°14' S. lat. The channels were in many places under water, and he was compelled to return from want of water and pasture for his horses. In 1850 Sir Thomas Mitchell published an admirable manual of geography for the schools of New South Wales, entitled 'Australian Geography, with the Shores of the Pacific and those of the Indian Ocean, descriptive of the Colonies and Settlements of South America.' He published in Sydney, in 1853 he again visited England. Having invented a new propeller for steam-vessels on the principle of the curious instrument used by the natives of Australia, he had the plan built and described the instrument which excited much interest. It was published under the title of 'The Steam-Propeller, History, and Description of the Boomerang Propeller, a Lecture delivered at the United Service Institution,' 8vo, London.

Sir Thomas Mitchell was advanced to the rank of colonel in 1854. He died October 9, 1855, at his residence in Sydney, and his remains received the honour of a public funeral.

MITCHELSTOWN, county of Cork, Ireland, a market- and post-town, and the seat of a Poor-Law Union, is pleasantly situated near the river Foss, on a small tributary, in 56°17' N. lat., 8°17' W. long., 30 miles N.N.E. from Cork, 129 miles S.W. by S. from Dublin. The population in 1851 was 3091. Mitchelstown Poor-Law Union comprises the parishes of Mitchelstown, Youghal, and 16 electoral divisions. The population of Mitchelstown in 1831, was 27,269. The town consists of an extensive square, containing some well-built houses, and of two principal streets with several smaller streets intersecting these at right angles. It contains the parish church—a handsome plain structure with a square tower—and a National school, and a town library. There are also a courthouse, fever hospital, dispensary, bridewell, and Union workhouse. Mitchelstown College, a group of neat buildings with a chapel attached, was founded by the Earl of Kingston for the support of 12 males and 16 females of his decayed Protestant tenantry. Each receives 40l. a year, besides a house and garden. On one side of the square is the gateway to the extensive demesne of Mitchelstown, the seat of the Earl of Kingston, which embraces with its towers and battlements forms a striking object. It was erected in 1833, and is the largest and finest of the modern castles in Ireland. Petty sessions are held monthly. Fairs are held January 10, March 25, May 23, July 30, November 19, and December 9.

Mitchelstown and Kigstown caves are two series of beautiful stalactite caverns, under small limestone hills about 8 miles from Mitchelstown on the Dublin road. One series, discovered in 1835, is 870 feet in extreme length by 572 feet in breadth.

MITFORD, MARY RUSSELL, one of the most delightful of our female authors, was born on the 16th of December 1786, at Alresford, Hampshire. Her father was a physician, and a man possessed of a fine mind, a love of unblushing and somewhat eccentric habits, and consequently unsuccessful alike in his professional pursuits and in his pecunary affairs. By his general want of management and inju-
dicious speculations he wasted his wife's property as well as his life and mind, with a characteristic, present mood—when his own fortunes were at the lowest ebb—to his daughter on her tenth birthday, of a ticket in the Dihlum Lottery, turned up a prize of 20,000l., that too was as thoroughly, though somewhat more slowly, dissipated as his previous wealth had been. Yet he was a man of kindliness, cheerful, and of sanguine temper, and Mary Mitford, his only child, without a murmur dedicated her life to the promotion of his comfort and happiness, and almost before arriving at womanhood devoted herself to literature as a means of eking out his diminished income.

At ten years of age she was sent to a boarding-school at Chelsea; and in addition placed under the special guidance of a governess, who, as Miss Mitford mentions in the introduction to her dramatic works, was not only herself added to the household, but also the means of making her pupils write verses also; and among her pupils she at different times numbered, besides Miss Mitford, Miss Landon (L. E. L.), Fanny Kemble, and Lady Caroline Lamb. Miss Kemble took the poetic fit strongly; and before she was twenty she had published three volumes of poetry, one of which was a romance in verse after the manner of Sir Walter Scott. They were not of much worth, but they met with rougher treatment at the hands of the "Quarterly," than their juvenile form deserved. But the latter, who had her disheartened, and she profited by the somewhat rough lesson.

Another volume of verse—"Wallington Hill; a Poem," was published in 1812. She had by this time deliberately adopted her father's pen-name, and was busy in writing short tales and sketches for the English Magazine. A number of these, collected and published, with confidence by those exercises, when the early celebrity, probably of the "Sketch-Book of Geoffrey Crayon," turned her thoughts to the writing of some descriptive sketches of English rural life. She went to the borders of Berkshire and Hampshire—Three Mile Cross, near Reading—had long been her residence; every lane and field, and almost every nook and corner of it, every house and cottage, and almost every person in them, was familiar to her; and so it was natural that faithful reproductions of country scenery and country manners as they existed in that small southern village would not be unwelcome to the world of readers.

But she met in the first instance with serious discouragement. Thomas Campbell was then editor of the "New Monthly Magazine," and the earlier essays of what ultimately formed "Our Village" were offered to him, but peremptorily rejected. They were beneath the dignity of his magazine. A subscription-list was accordingly opened, and twenty-five names were entered. "Lady's Magazine." There their freshness, genuineness, and faithfulness were recognised, and Miss Mitford, nothing loth, was called upon to publish them in a collected form. By the general public "Our Village" was warmly welcomed, and each successive volume of it found many imitators too, but hitherto no rivals. She wrote in the "Preface" when they were first collected:—"Her descriptions have always been written on the spot and at the moment, and in nearly every instance with the closest and most resolute fidelity to the place and the people. If she be accused of having given a brighter aspect to her villagers than is usually met with in books, she cannot help it, and would not if she could. She has painted, as they appeared to her, their little faults, and many virtues, as well as the intense and thankful conviction, that in every condition of life goodness and happiness may be found by those who seek them, and never more rarely than in the fresh air, the shade, and the sunshine of nature." This is a fair account of them, and they fairly represent, moreover, the gentle and healthful spirit of their authorship. "Our Village" is in all respects a work that more than any other represents in literature that phase of English taste and feeling, which is so characteristic of our own hest water-colour landscapes and scenes of country life, and of the pure air, and sunshine of England. "Our Village," altogether extended in its original collected form to five volumes, or series, the last of which was published in 1838. Of some of the sketches in the last volume Miss Mitford writes: "They are not a little want of the primal freshness, and in them, and in some of her later essays, there is too much yielding to the besetting sin of those who depict character—the tendency to exaggeration and caricature. "Belford Regis; or Sketches of a Country Town," in which the neighboring town of Reading, instead of the pretty country hamlet, supplied the material, was her most important subsequent work in a similar style. Her later sketches and essays furnished the great part of her two periodicals have not, we believe, been collected. Among her other works may be mentioned her "Stories of Country Life." She also for some years edited Fiden's "Tableaux," and three volumes of "Stories of American Life by American Authors." whilst at the Chelsea school Miss Mitford's dramatic tastes had been as carefully nurtured as her poetic tastes. The consequence was that in early life her most ardent aspirations, either as an author or actress, were directed towards the stage. She was the author of a number of plays of various kinds. Four of these were works of considerable importance. The first, "Julian," was performed in 1823, with Macready for the hero, and met with decided success. The "Fascinat" appeared with equal applause, but the "Kabouter," which was given in 1826, "Charles the First" was not so fortunate as its predecessors; Colman, then licensor of plays, having refused to sanction its performance on the ground of the impurity and danger of permitting the trial of an English king to be represented on the stage. Driven from the legitimate houses, Charles I. was at length brought out at a minor theatre, the Cobourg, and it has not apparently been repeated elsewhere. Besides these an essay, "Sakal and Kalasrade," written by her, was produced at the Lyceum, but was afterwards withdrawn. The female appearances were in an edition of her "Dramatic Works" (3 vols. 8vo, 1854), which, besides the pieces above named, included a tragedy—printed for the first time—"Otto of Wittenbach," "Innis da Caul," and others. But the "Dramatic Works" were, as she wisely withdrew a melodrama, "Gaston de Blondeville," and several "Dramatic Scenes." In looking at Miss Mitford's works, it should be borne in mind that they are written in a vein of refined fancy, full of happy images, and surrounded by pleasant circumstances, they were often related under the pressure of pensive discomfort and during much ill-health. As long as her father lived her attention to him was more mind than her success in the theatre, and shortly after his death it gave way entirely. Yet she lived and laboured on in her pretty Berkshire cottage, beloved by every friend, and cheered often by finding that her books had made her friends immortal. About three years before her death she was the accidental overturning of her pony-chaise, and thenceforth she was pretty much confined to her home; but through her prolonged and hopeless suffering, she retained her wonted cheerfulness, and even her old industry was continued. Beside her final deviation, in which her fame is chiefly founded—"Our Village"—for a new edition, which appeared in 1853, she compiled a sort of literary patch-work, "Recollections of My Literary Life; or Books, Places, and People," which is in fact a sort of general exhibition of her life. She had, she fancied, most influenced her mental career, with a somewhat large addition of extracts from her favorite authors. She also prepared the collected edition of her "Dramatic Works," already noticed—to which were prefixed various autobiographical introductions; and in 1854 she published "Atherton; a novel," in 3 vols. She died at her residence, Swallowfield Cottage, near Reading, on the 10th of January 1855. [4.]“
which brought him little profit or fame. He was also a member of 'The Musselburgh Forum,' a debating society, in which he favourably distinguished himself. In 1817 he entered into business as a partner, in his native town, with Dr. Brown, who had an extensive practice, and Dr. Moir worked hard at his professional duties, but, when the toils of the day were ended, he employed a great part of the night in his literary pursuits. He was at this time a frequent contributor to 'Blackwood's Magazine.'

When 'Blackwood's Magazine' was started, he became a still more constant contributor to its pages. He wrote for it both prose and poetry, both comic and serious. Among his comic effusions were 'The Eve of St. Mark,' 'The New Philosopher,' and 'Some Observations on the Art of Politicking,' which attracted the attention of the Emperor Napoleon I., and secured for him the post of auditor of the Council of State. These essays, as may be supposed, were of a highly absolutist cast, and though their author continued to hold the same position in the absolutist government, he eventually retired to Edinburgh, where he was elected a member of the Legislative Assembly. He took little or no part in its proceedings. The family of Conant Moly was of that rank which is known as the 'nobility of the robe,' and his ancestors were of gentle blood as long ago as the days of Henry IV. Talents and administrative capacity seem to have been hereditary in the family, as well as the love of legal order, monarchy, and constitutional government. Conant Moly was almost the last remaining link between his countrymen of the old and of the new régime, combining the high-bred tone and monarchical principles of the former with a proportion of the liberal principles which are the distinctive mark of the latter class. But while Conant Moly accepted each successive change in the governing system of his native country, he never could be said to have swerved in principle from the opinions which he had originally professed. At the close of his long career, under various successive changes of government, he retired in 1852, with relations with the ancient dynasty, and departed life as he entered it, a devoted to the old monarch. In his theological opinions he inclined to the Ultramontane party, and from his high character, great abilities, and illustrious position, he was one of the strongest supporters of the Roman Catholic Church in France. His memoirs, which naturally include reminiscences of all the great men and notables of France during the first half of the 19th century, were announced as in preparation, but have not yet (April 1855) been published. He died suddenly at his family seat at Château du Buisson, November 23rd 1855.

MOLE'SWORTH, RIGHT HON. SIR WILLIAM, eighth Baronet of that name, was born in 1810. He was the lineal representative of an old Cornish family of landed possessions, originally of Irish extract. Sir William was governor of Jamaica in the reign of Charles II. Sir William's father died in 1823. It is uncertain at what school Sir William Molesworth was first educated, but it is certain that having spent some time at Cambridge, he was sent to the University of Edinburgh, and there studied metaphysics, metaphysical science, and by an Italian refugee, and afterwards passed to a German university. In this latter soil his mind took deep root; he acquired the German language, and followed after the bent of his own vigorous and original genius. He was educated in the study of general and classical knowledge, he concentrated his powers in Germany upon the study of philology and history. His mind however revolted against the mysticism of the German school, and as soon as he was released from collegiate study he made the usual tour of Europe. On his return to England in 1831 he was still in his minority. His first public appearance in this country was at a meeting convened in his native county in that year for the purpose of supporting the Reform Bill, and has continued to the present occasion gave considerable promise of future eminence. He was little more than of age when he was returned to parliament unopposed in December 1832, for East Cornwall, by which constituency he was re-elected in December 1834, but withdrew from the contest in July 1837, when he returned for Leeds. At the dissolution of 1841, being convinced that his chance of success at Leeds was hopeless, he declined a contest, and remained out of parliament for four years.

During this period the government, in the name of the people, and social economy, gave him a sounder political education, and accumulated capital for his future senatorial life. In 1850, however, on the death of Mr. Wood, he offered himself as a candidate for the representation of Southwark, and though strenuously opposed by a strong member of the Whig party, was elected. He was sent to Mollinsworth College, he was successful, and he continued to represent the same constituency to his death. In January 1853 he accepted the office of First Commissioner of Public Works on the formation of Lord Abercorn's land admi-
MOLLUSCA. It is but bears posterior, larger.

was re-elected without opposition; and again on his subsequent translation to the Colonial Office.

As a 'Commons' debater Sir William Moleworth was not of first-rate eminence. His speeches in parliament were few, but always of very high value. He was a Cæsar of tone and principle, generally popular. Those on the colonies, delivered in 1838; in 1840 on the state of the nation and the condition of the people; on transportation, in 1837-38; and on many important questions, were of great merit and immense practical utility. They were carefully prepared beforehand, and were the results of reading, labour, and reflection.

In July 1855 Sir William Moleworth found a sphere far more congenial to his tastes, and more congenial to his administrative ability, on being appointed to the secretariestry of the colonies, but he held that office only for the brief space of four months, when his career of public usefulness was cut short by death, which occurred on the 22nd of October 1855. The colonial and domestic press was all but unanimous in expressing their satisfaction at his appointment; it was not forgotten that he had taken the deepest interest in the affairs of Canada and Australia, and had studied the problem and mastered the theory of colonisation to a greater extent than perhaps any contemporary. Neither was it forgotten that he was the first person who, in this country, succeeded in calling public attention to the manifold abuses connected with the transporation of criminals, though eighteen years had elapsed since the Select committee, on which he was chosen, brought to light all the horrors of our penal system.

In the words of a writer in the 'Times,' 'Sir William Moleworth found our colonial empire disorganised and discreditable, but with the appointment of the Colonial Office had welded as it then was to a system of ignorant and impertinent interference. He first aroused the attention of parliament to the importance of our remote dependencies, and explained with incomparable clearness and force the principles of colonial self-government. With untiring diligence, and great constructive power he prepared draught constitutions, and investigated the relations between the imperial government and its dependencies. Starting from a small minority, he brought the public and parliament over to his side, till principles once considered as paradoxes came to be regarded as axioms. By such means he fairly won the position of Secretary of State for the Colonies; but he did not live to enjoy the prize which he had grasped. Before we had time to hear of the satisfaction with which his appointment was sure to be hailed by our remote dependencies, the sceptre was snatched from his hand by death, and the post became again vacant. In the full vigour of life and intellect, in his possession of what must have been to him the highest and most interesting office, in the possession of the confidence of his sovereign and the esteem of his fellow-subjects, he was taken away suddenly and prematurely, yet not so soon as to deprive his friends of the consolation of thinking that he had filled the place he durably occupied which will link his name with the destinies of every British colonisation—the plantations on the face of the earth. The best monument that could be raised to him would be a complete collection of his parliamentary speeches; the noblest epithet that could be inscribed on his tomb would be the title of the 'Liberator and Regenerator of the Colonial Empire of Great Britain.'

Though he had not avowedly appeared before the public as an author, Sir William Moleworth was favourably known in the world of letters and science. Having purchased the 'Westminster Review,' he for some years conducted it either alone or in conjunction with his friend, Mr. John Stuart Mill, the eminent political economist, and during that time he was a not unfrequent contributor to its pages; he likewise wrote at different times many articles in other periodicals and newspapers. He also edited and published at his own expense a complete edition of the English works of the philosopher Hobbes, in 16 volumes. [Hobbes, Thomas.] In addition to these, Sir William Moleworth had obtained some reputation as a botanist; he was appointed a member of the Linnean Society, and in 1838 was elected one of the large range of subject. In private life few men have been more highly esteemed.

MOLLUSCA. Referring to the articles CONCHIFERA, GASTROPODS, and BIVALVES, and Malacology, fora complete account to the zoological arrangement and subdivision of the various families of the Mollusca, we shall in the present article consider the animals which constitute this great group in a purely anatomical and morphological point of view; that is, we shall endeavour to show—firstly, what Common Plan or Archetype is discoverable among the varieties of Mollusca forms; secondly, in what way the Common Plan is more specially modified in the leading sub-types of this great division: of the animal kingdom; thirdly, the various modifications of the same, into which the Archetypes have been—and fourthly, the development of the Mollusca, so far as it bears upon the idea of a Common Plan or Archetype.

1. The Common Plan or Archetype of the Mollusca.—By the Common Plan or Archetype of a group of animals we understand nothing more than a diagram, embodying all the organs and parts which are found in the group, such as rails, rods, and bent; and each of these parts is divided into its various subdivisions, so that diagrams of a work on mechanisms have to actual machines, or those of a geometrical work to actual lines and figures. We are particularly desirous to indicate the sense in which such phrases as Archetype and Common Plan are here used; as a very injurious realism—a sort of notion that an Archetype is itself an entity—appears to have made its way into more than one valuable anatomical work. It is for this reason that the term Archetype had not so high authority for its use, we should prefer the phrase 'Common Plan' least ambiguous.

There are two modes in which the Archetype or Common Plan of any group of animals may be set forth. In the first, the community of plan among the members of each group would be represented by lines being compard together, the general Common Plan would be deducible. But this analytical method (which has been carried out to a certain extent for the Mollusca by the writer in a Memoir in the 'Philosophical Transactions' for 1839), would require more space or illustration than can be devoted to it; we must, therefore, take the opposite course, and, assuming a Common Plan, trace out its modifications in the subordinate plans, and explain the laws by which operation they may be affected.

The assumed Common Plan or Archetype of the Mollusca may be represented by fig. 1. 1—

This figure is supposed to be bilaterally symmetrical, and the following parts and regions to be distinguished in it: (1) The Brain Region, or that area of the animal which at the front is situated, and which corresponds with what is commonly termed the dorsal region. The word dorsal, however, is vague, being used in different senses in various divisions of the animal kingdom, and should therefore be abandoned in philosophy. The cerebral region is, however, or at least that portion of the brain (N) is termed, not ventral, but Neural, inasmuch as it is the region in which the great centres of the nervous system are placed. The termination (a) is the anterior oval; the bud (u), the posterior, the European in it. The neural surface is that upon which the majority of Mollusca move, and with which they are supported; and it is commonly modified to subserve these purposes into a muscular expansion or disc called the Foot. Three regions again, often very distinctly divided from one another, may be distinguished in this foot:—an anterior, the Propodium (pp); a middle, the Mesopodium (mu); and a posterior, the Metapodium (wm). In addition to these, the upper part of the foot or the Portion (w) may be produced, by a sublateral enlargement on each side, just below the junction of the hemal with the neural region—the Epipodium (ep). The mass of the body between the foot proper and the abdomen, or post-abdomen, which bears the Epipodium, and whose limits cannot not very well be defined, though it would be very convenient to have a name for it, may be termed the Mesosoma (m-body); and for what is loosely called the head the same Prosoma might advantageously be adopted. On the upper part of the foot or Portion there may be profusely distributed, as organs of sense: the Eyes (which may be supported on pedicles—Ommatophores), and the Tentacles. In the neural region the integument may be peculiarly modified and raised in the form of various series of swellings, the Arrangement of the anus, and when so modified it is called a Mantle (Palium). In front of the anus again the Branchiae (t) project, as processes of the hemal region. Among the internal organs we need only point out the position of the Heart (s, 9), which lies in front of the branchial in the hemal region; and the
Nervous Ganglia (x, y, z), of which there are three principal pairs arranged around the alimentary canal, which they encircle by means of their commissures.

![Diagram](image)

I. The Ideal Archetype or Common Plan of the Mollusca.
II. Modifications resulting from the development of the Post-Abdomen.
III. Modifications resulting from the development of a post-abdomen and consequent haemal flexure.

M. 

1. Modifications Resulting from the Development of a Post-Abdomen and Consequent Haemal Flexure.

The latter have the same significance to these and all the other figures, with the exception of figure 10.

Such is the Common Plan of which all Molluscs whatsoever may be regarded as modifications; the next question is, to consider the laws according to which the plans of the great sub-classes of the Mollusca may be derived from it.

2. Modifications of the Common Plan.—The structural peculiarities of all known Molluscs may be very simply accounted for by the excessive or defective relative development of certain regions in the Archetype, more particularly of one or other parts of the Haemal Region. Of this region the portion which lies in front of the anus may be conveniently termed the Abdomen, while that which lies behind it the term Post-Abdomen may be applied. Now, if it be supposed that the Abdomen grows out of proportion to the rest of the body, constituting a kind of prominence, and that the intestine passes into the outgrowth so as to form a sort of loop (fig.), it is clear that the open angle of this loop will be turned towards the Neural surface; and the intestine may be appropriately said to have a Neural flexure. On the other hand, if it be supposed that the Post-Abdomen grows out in the same way, and draws into itself a loop of the intestine, then the open angle of the loop will lie in the opposite direction, that is, it will be directed towards the Haemal surface; the intestine therefore may in this case be said to have a Haemal flexure. It will be readily understood that either Abdomen or Post-Abdomen may develop a mantle or not, and that the existence or absence of this mantle have to do with the nature of the change in question, however much it may affect the external appearance of the resulting form.

Again, the extent to which the Abdomen or Post-Abdomen is developed may have a great influence on the relative position of certain organs of the Mollusc. Thus, in the first place, the position of the anus may become greatly altered. When there is a neural flexure it will acquire a direction towards the neural surface and backwards, the final approximation to the neural surface depending on the development of the abdomen on the one hand, and that of the neural region on the other. Again, if the outgrowth of the abdomen take place, not symmetrically, but more or less on one side of the median line, the final position of the anus will be towards the opposite side and to the right or left, as the case may be.

It is even conceivable (this amount of modification indeed actually obtains in nature) that by an exceedingly one-sided development of the abdomen, the anus may be thrust round on to the haemal side. Its final position therefore must not be regarded as certainly indicative of the direction of the flexure by which it obtained this position. Where there is a neural flexure again, the direction of the anus will be normal to the neural surface; and it may thus be directed forwards; its approximation to the head, its asymmetrical position, and the amount to which it may be thrust backwards and towards the neural side, depending upon conditions of the same order.

It is not merely the anus which is affected by these changes however; the branchiae (and the heart which follows them) undergo similar transpositions, whose nature and origin it is very necessary to understand, in order to appreciate their close as organic characters. M. Milne-Edwards long ago pointed out the singular fact that, in certain Molluscs, the branchiae are in front of the heart, while in others they are behind it. The latter he termed Opisthobranchiate, the former, Prosobranchiate. It will be seen that our Archetype is Opisthobranchiate. Now, it is easy to understand that if an Abdomen were developed in front of the heart, without involving the cardiac region, the Mollusc would remain opisthobranchiate; if however it were more extensively developed, so as to involve the heart and branchiae, the former having been in front, would eventually take a position posterior to the branchiae, and the Mollusc would thus become prosobranchiate. So, with regard to the development of a Post-Abdomen; its effect on the position of the heart and branchiae may be similarly determined. An absence of the neural surface which it involved. It follows, therefore, that Opisthobranchism may co-exist with either a haemal or a neural flexure, or with none; while Prosobranchism indicates one or the other, but not both; and that these organic characters, however valuable, are secondary to and therefore of less importance than the neural and haemal flexures (that is, development of an abdomen or post-abdomen), on which they depend. Dealing with the facts furnished by adult structure alone then, there are two primary modifications of the Molluscan Archetype, which may be shortly termed the Neural and Haemal Plans. The Cephalopoda, Pteropoda, Lamellibranchiata, Brachiopoda, and Polyzoa, are the molluscs which present modifications of the Neural Plan. The Heteropoda, Gastropoda, Polyplacophora, and Aequiibranchiata, are those which present modifications of the Haemal Plan.

The Neural Plan and its Principal Modifications.—Milne-Edwards has proposed a division of the Mollusca into the Mollusca proper, and the Mollusca (Molluscoidea), including under the latter class those Polyplacophorian forms, the Polyzoa and the Aequiibranchiata. Believing that the Mollusca included all those invertebrates in which the anus, or Mollusca, we nevertheless consider the distinction drawn by the eminent French naturalist to be very important, and that it should be retained as a primary subdivision of the great Haemal and Neural Divisions. In the haemal division the limits of the Molluscoidea are the same for us, as for M.
The Polyzoa.—Conceive the abdomen of the Archetype to be greatly prolonged, the neural region with its appendages, the organ of sense and the heart remaining undeveloped; so that the anus comes into close apposition with the oral extremity, while the edges of the latter are produced into long ciliated tentacles, and the result will be a Polyzoa, which needs only the power of gellation to give rise to those composite aggregations which are so characteristic of the group.

The Polyzoic type itself presents five subordinate modifications in the five principal orders of the group:—the Cyclostomata, Ctenostomata, Cheilostomata, Hipposcoopya, and Pedicellaria.

In the first three, the body of the Polyzoa when fully expanded is completely straightened, there being no permanent fold or inversion of the integument. In the last two there is such a permanent inversion. In the Cyclostomata the horny or calcareous deposit in the integument of the abdomen forms the soft parts by an even level edge, and there is nothing which serves as a cover or operculum for the retracted Polyzoa.

In the Ctenostomata (fig. 2, 3) the margins of that portion of the abdomen which is inverted in the retracted state are produced into a toothed horny sheath, which can be retracted by special muscles, and which serves as an operculum. In the Cheilostomata (fig. 2, 1) the horny or calcareous deposit takes place in such a manner that the hardened integument of the front portion of the larval region constitutes a sort of lid, regularly articulated upon the hinder portion, and provided with proper occlusor (and perhaps levator) muscles. It should be noted that the anal aperture is directed away from this lid or operculum.

In each of the previous divisions the tentacles are arranged on a circular disc, or lophophore, of whose edges they are prolongations; but in the great majority of the Hipposcoopya (fig. 2, 3), which are all fresh-water forms, the lophophore is so produced into two arms on the anal side as to assume a horse-shoe shape. It is important to consider this in connection with the peculiar features presented by the Brachiopoda.

Thirdly, we venture to regard the peculiar genus Pedicellina (fig. 2, 4) as constituting an order by itself. Essentially a Polyzoa, it is nevertheless distinguished from all other Polyzoa by the circumstance that its tentacles are united together by a membrane into a cup, which cup is never protruded far beyond the general boundary of the body.

The Cheilostomata are remarkable for possessing two kinds of moveable appendages—Patellaria, whip-like processes, articulated to a bulb containing muscles by which they are moved; and Ancillaria or bird's-head processes (fig. 2, 6). The structure of the latter is of great interest in a morphological point of view, and demands particular attention. They consist of a larger piece, or valve (p), shaped like a bird's head, and produced into a longer or shorter process of attachment, to which a smaller valve (e), representing the bird's lower jaw, is articulated. Stalked or sessile, these ancillaria present during life an incessant snapping action, produced by the alternate contraction of two sets of muscles, which arise from the concavity of the 'skull' of the bird's head by wide fan-shaped origins, and seem to be inserted by narrow tendons into the smaller articulated valve. The one tenon (e) is inserted into the smaller valve in front of the line of articulation, and the other (a) behind it, and therefore by their alternate action they raise and depress the lesser valve upon the larger.

The Brachiopoda.—Now, if we compare the relative positions and mode of articulation of the operculum and cell of a Cheilostomatous Polyzoa, or of the shell of an avicularium, with those which obtain in the shells of the typical Brachiopoda, such as the Terebratulidae and Bithyniellidae, the resemblance will be very striking; and still more so, if in addition the arrangement of the muscles be taken into consideration. In such a Brachiopod, in fact (fig. 3), the shell is composed of two valves—one large, excavated, and produced into a canal or tube, through which a pedicle of attachment passes; while the other is smaller and more or less flattened. The two valves are articulated together by means of a socket in the smaller valve and a tooth in the larger, on each side, the intermediate space being free, just as the operculum of the Polyzoa is united with its cell, or as the lesser valve of an avicularium is articulated with the larger. So likewise the anal extremity of the Brachiopod is turned from the smaller valve. Then the arms of the Brachiopoda are essentially comparable to those of the lophophore of a Hippocrepian Polyzoa, except that their direction is different; the calcified supports to which they are fixed in many Brachiopoda, are so variable in form and so extensively absent in others, that their ex-clause can in no wise affect the homology of the parts. Again, if we leave out of consideration the pedicle muscles (which are however, in all probability, as Mr. Hancock has shown, the homologues of the retractors of the Polyzoa), the arrangement of the other muscles is precisely what we have seen to obtain in the avicularium: the adductors which pass from the larger valve to be inserted into the smaller, in front of their point of support, corresponding precisely with the occlusor muscles of the avicularium; while the cardinal muscles, which arise from the larger valve, and pass to be inserted into the cardinal process of the smaller, behind the point of support, are identical with the divaricator muscles of the avicularium.

The existence of distinct muscles for the purpose of separating the valves of the shell is characteristic of the Polyzoa and Brachiopoda, the only approximation to such an arrange-
ment at present known among the _Lamellibranchiata_ being presented by the _Pholades_.

Finally, if the great proportional size of the _Brachiopoda_ their pedunculated attachment, their thick and solid shells, and their simple forms, they brought forward as arguments against the view we take of their essentially polyzoic nature, we would remark the object of the like opposition in such features between _Botryllus_ and _Botryllus_, or _Apodium_, among the Ascidians.

Two principal modifications of the common _Brachiopoda_ plan are to be observed. In the _Terebratulidae_ and _Rhynchonellidae_, and in all probability in their extinct allies the _Spiriferidae_, _Orthisidae_, and _Productidae_, the muscles are always arranged in three sets—Adductor, Cardinal, and Peduncular. At the same time the mantle (whose homology with the produced edges of the non-retractile part of the abdomen of a Polyoon is at once appreciable), though divided into two distinct lobes in front, is continuous and entire behind, that is, towards the peduncle. A still more remarkable feature in their organisation is that, at least in _Ptilodictya_ and _Rhynchonella_, there is no anal aperture, the intestine terminating in a cecum, directed towards the middle of the large valve.

In the _Cranidea_, _Discinidae_, and _Lingulidae_ the muscles have a very different arrangement, which could only be rendered intelligible by detailed description and illustrations, as the homologies of these muscles with those of the other division are not yet determined. The lobes of the mantle again are completely separated (_Discina_, _Lingula_, _Cronia_), and the intestine opens upon one side of the body between these lobes. There are no teeth, and the articulation of one valve with the other and the modes of attachment vary remarkably; _Lingula_ having a long peduncle; _Cronia_ being attached by the surface of its lower valve; and _Discina_ having an aperture in the corresponding valve through which a portion of the adductor passes, and spreading out at its extremity into a sort of ping, acts as a pedicle.

**Neural Mollusca.**—The _Lamellibranchiata_. In all _Mollusca_ proper the neural region is developed to a much greater extent than in the _Mollusca_, and there are always three pairs of ganglia, two _Cerebral_, two _Pedal_, and two _Parieto-Splanchnic_ (or _branchial_). The special characters of the _Lamellibranchiata_, as modifications of the _Archetype_, are the following:—The _hemal_ region is well developed in its abdominal portion, but forms no prominent sac-like abdomen, into which the viscera enter in the adult condition. Its edges are produced into extensive palial lobes, which are arranged on each side of a longitudinal plane, and not above and below a horizontal one (or more properly before and behind a transverse one), as in the _Brachiopoda_. The mouth is surrounded by a fringe, representing the tentacles in the _Mollusca_ (as may be well seen in _Pecten_, fig. 4, 4) which is produced laterally into elongated ‘palps,’ but not provided with any manducatory apparatus. The intestine passing from the stomach either forms a simple loop with a second open angle directed hemalia, or this loop may be much coiled and convoluted, the intestine finally passing over the great posterior adductor and terminating between the lobes of the mantle behind it.

The foot may be more or less largely developed, but never presents any clear distinction into _pro-meso- and metapodium_, unless indeed, as we are inclined to suspect, the whole free portion of the foot of the _Lamellibranchiata_ ought to be regarded as a modified metapodium. Besides the pedal muscles, the Lamellibranchs possess one or two characteristic muscles—the adductors, which approximate the valves of the shell, and whose greater or less development seriously affects the ultimate form of the animal.

The gills do not lie little from the archetypal form and position in some Lamellibranchs, such as _Trigonia_ and _Pecten_, merely thrown downwards by the development of the mantle. In _Fucula_ (fig. 4, 3), their inner edges are united posteriorly, but they remain comparatively small, in the majority of Lamellibranchs, however, the gills are exceedingly large in proportion to the rest of the body, and consist of two double plates, which are united with the mantle and with one another, in such a manner as to divide the pallial cavity into two chambers, a _supra- _and _infra-branchial_, which communicate only by the passage between the anterior edge of the branchiae and the foot, and by the multitudinous perforations in the branchial plates themselves.

It is in the absence of external organs of sense or of any buccal masticatory apparatus, and in the peculiar arrange-
forms, the former being as much as possible elongated longitudinally, the latter attaining the extreme of concentration about a centre. At the same time there is a reduction of parts to a minimum, as shown in the absence of a second adductor, and of any foot in the adult state. The differences between these forms are, however, decidedly less than those which may be observed between the extreme forms among the Cephalopoda or Gastropoda.

The Pteropoda and Pulmonata.—The Lamellibranchs are, as we have said, curiously exceptional in preserving the general characters of the Mollusca proper, without that singular buccal apparatus which we meet with in all other members of the subdivision, whether neural or hemal, and whose peculiar nature is described below. Again, they are exceptional in the vast development and symmetrical longitudinal division of their mantle, and in the corresponding division of their pallial shell into two pieces or valves—characters we shall not meet with again in any modification of the Common Plan.

In the Pteropoda and Pulmonata the mantle is never developed into such lateral lobes, and the shell to which it gives rise never consists of two pieces, but is constituted by a single mass, which either has the form of a flat plate or presents some modification of a cone. Again, the foot (or some part of it) is always well developed, presenting no obvious distinction into regions in the Pulmonata; but in the Pteropoda often exhibiting a well-marked meso- and metapodium, and always presenting a characteristically large epipodium—an organ which in these Mollusca constitutes the so-called 'wings,' from which their name is derived.

**Fig. 5.**

There is usually a well-developed mantle in the Pteropoda and Pulmonata, and its wall acts as a branchial surface without being produced into true gills—(Hyalaea)—the sea-water in the marine Pteropoda and the air in the terrestrial and aquatic Pulmonata being inspired and expired into its cavity.

In the Pteropoda in general, the aperture of the pallial cavity and that of the anus, are situated upon the posterior surface of the body, in accordance with the neural structure of the intestine. The anal aperture however is usually thrust to one side of this surface, and, in Limacina and Spiralis, this lateral thrust has taken place to such an extent, that not only the anal aperture, but that of the mantle cavity, is thrown up completely on to the dorsal surface. This lato-dorsal, or dorsal position of the anal and respiratory apertures, is as regular in the Pulmonata as it is exceptional in the Pteropoda.

In the Pteropoda and Pulmonata some most important modifications of form are produced by the greater or less development of the mesoepistomes on the one hand and of the mantle on the other. The predominance of the latter is to be observed in such forms as Crisia, Cleodora, Hyalessa, and Helice; while the former may be seen in Pneumodermon and in Limacina. In the latter the mantle is very small, and in the former it is almost if not entirely absent; what is ordinarily considered as the mantle in this mollusc being in fact nothing more than the mesoepistomes. The like con-
shell, and in the nature of the appendages into which the edges of the foot are modified—characters which do not attain to ordinal importance in other divisions of the Molusca.

Having thus glanced at all the leading modifications of the Neural Plan, we may now turn to the Hemal Plan, commencing with its Moluscid modification constituted by the Ascidioida alone.

The Ascidioida.—As a Moluscid group, the Ascidians are characterised, in the first place, by the rudimentary condition of their whole neural region, and by the reduction of their nervous system to a single infra-esophageal ganglion. Besides these, however, their organisation presents certain characters which appear at first sight very remote from such a Common Plan as has been described, and hardly deducible from it. As Ascidians, in fact, is usually fixed by one extremity of the body, and presents at the other two apertures. One of these leads into a wide cavity, whose entrance is fringed with a circle of tentacles, and whose walls (except along the middle line anteriorly and posteriorly) are perforated by innumerable ciliated apertures, and often thrown into folds, by which their surface is greatly increased. At the bottom of this cavity—the branchial sac—a second wide aperture leads into the alimentary canal, which invariably presents a haemal flexure, and then almost always fixed by one extremity of its small ciliated apertures which have been mentioned. The single ganglion lies between the oral and cloacal apertures.

Fig. 7.

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<td>a. oral aperture.</td>
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Now, in what manner is this form derivable from the Archetype? It is to be remarked, in the first place, that the pharynx, large in the Potyzoa, becomes comparatively enormous in the Ascidians; while the tentacles, which were very small in the former case, become large in the latter; in the Ascidians the haemal flexure, which in the former case was very slight, but had been developed, and that its free margin remaining small and narrow, has followed the anus to the neural side, while its cavity has extended up on each side of the pharynx to the middle line of the haemal surface of the latter, carrying with it the haemal cavity. This is seen in Cynthia, and giving rise to the atrium, imagine also that the sac thus constituted externally by the inner surface of the mantle (third tunicle), and internally by the pharynx, becomes perforated by minute apertures—and the result would be an Ascidian.

Such is the manner in which the Ascidian type is derivable from the Common Plan. Of this type the group presents three anadactyl modifications. The first is that presented by the external form as seen in Cynthia (7, 7), which in a manner represents permanently the larval state of the more perfect members of the group—swimming by means of a long rapidly-vibrating tail, like that of a tadpole. In Appendicularia there is no cloacal aperture or atrium. The mouth opens into a wide pharynx representing the branchial sac of other Ascidians; from this a gutlet leads into the stomach. The narrower intestine passes from the stomach, forwards and to the haemal surface, its cavity being also perforated by minute apertures, the duct being surrounded by any special cavity. In Appendicularia therefore it might be said to be a form in which the process of modification of the Moluscan Archetype into the Ascidian type is arrested half way.

In all other cases this process is complete, and there is a distinct cloacal aperture and atrium; but these forms again may be arranged under two great sub-types of modifications, according to the development of the branchial sac relatively to that of the meso-abdomen. In such forms as Cynthia, Botryllus, Perophora, Botryllus, the branchial sac attains so great a proportional size as to occupy the whole, or nearly the whole, length of the body, the intestine lying on one side of it; these might therefore be well denominated Ascidia Haemal Branchial Ascidioida. On the other hand, in Clavelina, Aplidium, Polycystus, Salpa, the alimentary canal lies completely behind the branchial sac, which is proportionally small, and these might therefore be termed Ascidia Intestinalia, Intestinal Ascidioida. A very complete mutual representation will be found to obtain between the members of these two groups.

Hemal Molusca.—In passing from the Hemal Moluscosa to the Hemal Molusca, we find the same new features presenting themselves as in the Neural Division, the transition being even more abrupt, from the absence of any representative of the Lamellibranchiata. In all these Molusca, in fact, there is a more or less well developed foot; a distinct head, with its organs of sense and buccal armature; and three pairs of ganglia—cerebral, pedal, and parieto-spinalchic.

The modification of the Common Plan is carried to a less extent in this than in the Neural Division, the chief varieties of its forms depending on the changes in the shape of the shell with which the majority are provided; in the greater or less development of the different regions of the foot; but most of all in the relative proportions of the mesosoma and mantle.

If we divide the Hemal Molusca into two great groups—the one consisting of the Heteropoda, Scutibranchiata, Tubulibranchiata, Pectinibranchiata, and Cephalocheiata. families, which are most intimately allied, and which are connected as a group by the fusion of their reproductive organs; and the other of the Vridibranchiata, Inferibranchiata, and Testibranchiata, families in like manner united, among other characters, by their common hermaphrodisism, then we shall find in each such group two extremes of form—the one resulting from the great development of the palpial region, the other from that of the mesosoma. In the Monoecious Division, Dentalia, Verruca, Atlanta, and the ordinary Pectinibranchiata may be regarded as examples of the former group; while in the Monocious Division the Inferibranchiata and Testibranchiata, while the mantle becomes rudimentary or absent altogether in the Monocious Dentalia, in the Monocious Phyllirose, and the Vridibranchiata in general, where the region from which the mantle is derived is that which is called the mesosoma, commonly called the mantle of Atlanta for example, but of its mesosoma, which

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The foot in the Monocionous Hemal Mollusca rarely presents any special development of its different regions, except that in certain forms—namely, Aplysia and Gasteropeteros—the epipodium is as well marked as in the Pteropoda, and serves the same end in locomotion. This is well known in Gasteropeteros, and we have seen a tropical Aplysia "fly" through the water in precisely the same way as a Pteropod would do. These epipodial lobes have been frequently called mantle, although the true mantle is a most distinct and obvious structure.

In the Dioecious group the epipodium is never well developed, presenting itself at most under the form of little lobes and processes—at least it would seem probable that the neck-lappets and head-lappets of the Trochodide are rudiments of the epipodium. On the other hand, it is in this group that the propodium, mesopodium, and metapodium attain their most complete and distinct form; as in Atlanta, where the propodium constitutes the anterior flattened fin, the mesopodium the rounded sucking disc, and the metapodium extends backwards, as the tail-like lobe which carries the operculum. In Firoloides we find that the mesopodium has vanished, and the metapodium has taken the form of a mere filament, while the propodium constitutes the great swimming fin.

In the ordinary Pectinibranchia, on the other hand, the foot may not be differentiated into its subdivisions at all, the metapodium being marked only by the position of the operculum, when this exists, as in Bucephalus. In other cases, as in Oliva and Sigaretus, a deep cleft marks off a very distinct propodium from the conjoined mesopodium and metapodium; in others, as in Pteroceras, the metapodium is as specialised as in Atlanta; while again, in such forms as Natica, the three constituent parts are distinguishable—the propodium constituting the hood in front of the head; the mesopodium the creeping disc; and the metapodium the opercular lobe. (Fig. 9.—8 and 9.)

If we bring in review those modes of arrangement of the various organs of the Mollusca which constitute the Common Plan of the group and the subordinate plans of its leading subdivisions, we have next to consider the peculiarities presented by these classes themselves, or, in other words, those more striking features in which the organs of the Mollusca differ from those of the Vertebrata, Annuulose, and Radiata. The most important organs, in this point of view, are those of—I, the Alimentary; 2, the Circulatory; 3, the Respiratory; 4, the Renal; and 5, the Nervous System.

1. The Alimentary Organs, in certain Mollusca, present two kinds of apparatus which are met with in no other division of the Animal Kingdom. The first of these is that peculiar mandibular apparatus usually called the 'tongue' which is possessed by all the Mollusca proper, except the Lamellibranchiata; and for the first description of whose true structure and mode of action we are, believe, indebted to Mr. Thompson (see article 'Tongue', in the 'Cyclopedia of Anatomy and Physiology'), although the organ itself had been more or less an object of attention ever since the time of Cuvier.

Foot of Pectinibranchia.—1, Trocha; 2, 3, Natica.

The tongue is essentially composed of a cartilaginous mass, with a pulpy-shaped upper and anterior surface, which projects from the bottom of the oral cavity. An elastic plate plays over the lappet, and is attached at each end to muscles which arise from the upper and lower surfaces of the cartilaginous mass. Along the middle line of this elastic plate successive transverse series of strong recurred teeth are set—new ones being continually formed behind as the old are worn away—in a sort of persistent dental sac.

When the tongue is brought into play it is protruded by appropriate muscles from the cavity of the mouth, and its extremity is firmly applied against the body to be rasped. The anterior and inferior sets of muscles, which are inserted into the corresponding ends of the elastic plate, now contract alternately, and the resulting action is precisely that of a circular saw. It is by means of this apparatus that the Carnivorous Mollusca bore through the shells of the animals upon which they prey; and perforated shells, which have been thus emptied, abound on every coast.

The other appendage of the alimentary canal peculiar, so far as we at present know, to the Mollusca, is what is termed the Crystaline Style, a transparent, usually elongated body, which projects by one end into the stomach, and is lodged for the rest of its extent in a sac formed by a diverticulum of the

* Our Mollusca include the consideration of the tegumentary and genital systems, whose peculiarities, however, are less exclusively Mollusca.
that organ. The Crustacean Style is found in a great number of the Mollusca (Oxylastina, by some supposed to be confused), but each has been observed in only a few Pectinibranch Molluscs, such as Pteroceras, Strombus, Trochus, and Murex. Its function is wholly unknown.

At the alimentary appendages, the Liver in one group, the Ascidians, departs sufficiently from the ordinary plan to deserve particular notice. In these animals (fig. 7, No. 4, &c) it always consists of a series of narrower or wider anastomosing tubes, commencing in cæca upon the outer surface of the intestine, and passing inward and upward, and terminating by a narrow duct, in the stomach. In the Botryllidae the hepatic tubes are remarkably wide.

2. The nature of the Circulatory System in the Mollusca is in some respects a vexed question, more especially as it is not possible to detach the arteries from the veins without leaving any doubt as to the true system of vessels or not. Without entering into any discussion of the various arguments used on both sides of a dispute which is in some respects verbal, we may be permitted shortly to state our own conclusions on the subject.

In the Polypods there are no special circulating organs, if we except the cilia with which the perivisceral cavity is often lined, and which keep up a continual current in the perivisceral fluid; nor do we imagine that any one will insist that the blood of the perivisceral cavity is not a sanus, but has a truly venous lining membrane.

In the Ascidians there is a heart, but it is a simple muscular sac, open at each end, and possessing the extraordinary property of being able to contract more rapidly than any other vertebrate. It thus circulating its blood first in one way and then in the opposite. The blood thus poured out is driven through channels in which assuredly no separate lining membrane is demonstrable. Indeed it is difficult to comprehend how any one can persist in regarding under his microscope these animals as having心脏, but that here, at any rate, the circulation takes place through lacunose, and not through vessels with distinct walls.

In the Brachiopoda a very remarkable vascular system has been said to exist, consisting of two hearts (in Rhynchonella) and a ventricle; the former being in free communication with the perivisceral venous sinuses (perivisceral cavity, notis), while the latter ends in an aorta, whose branches undergo a regular distribution. Such is the circulatory system in the Brachiopoda according to Professor Owen; but our own inquiries have tended to strengthen very greatly the doubts first raised by Mr. Hancock as to the true nature of this so-called circulatory system. It fact these inquiries lead us to doubt whether any one of the organs described in any of the Brachiopoda has anything to do with the circulating system; inasmuch, as, in the first place, we are pretty confident that no arteries are given off from the spicules of the ventricles, as has been said, and think it more than probable that they open external communication with the venous system, either indirectly from structure or directly from observation during life, that the so-called 'hearts' of any Brachiopod are contractile. Thirdly, the multiplication of these hearts to four in Rhynchonella seems not a little to militate against its cardiac nature.

We may fairly conclude then, that for the present, the nature of the circulatory system in the Brachiopoda must be regarded as an open question.

Mollusca Proper.—The doctrine first advocated by M. Milne-Edwards that in these Molluscs the circulatory system is always more or less incomplete, has met with a wide acceptance, but also with no small opposition. So far as the minute transparent Molluscs, which can be submitted to direct microscopic investigation, are concerned, many persons do not understand how the truth of M. Milne-Edwards's doctrine can be questioned. If the term 'venous lining' is to have any meaning but a non-natural one, assurely it cannot be said the truth that anything of the kind exists in the sinuses of Fideides, or of Atlanta, or in those of the Pteropods.

In the larger Molluscs, on the other hand, much depends on the verbal question—what is the definition of a 'vein,' or a vein; and only the direct microscopic inspection of the live animal can, we think, lead to a satisfactory solution of these questions. In the Brachiopoda we cannot understand how the truth of M. Milne-Edwards's doctrine can be questioned. If the term 'venous lining' is to have any meaning but a non-natural one, assurely it cannot be said the truth that anything of the kind exists in the sinuses of Fideides, or of Atlanta, or in those of the Pteropods.

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the gills of fishes (especially Amphioxus) more than any other structure to be found in other Invertebrata (the nearest approximation perhaps is in the cloacal branchial of Neuroterus Larve and of some Annelids). Like the wall of the gill-pouch of Lamellibranchiata, that of the branchial sac of Ascidians is fundamentally composed of two elements—a superficial strong framework of branchial bars corresponding with the 'gill-branches,' and a deeper vascular network connecting these. The more obvious peculiarities in the branchial sac of Ascidians, produced by the plaiting of its wall into the so-called branchial folds, which may vary in number from four (Cynthia) to a number so great that the wall of the sac appears crinkled (Phallusia).

3. Ascidians. The existence of a special organ for the urinary secretion has now been demonstrated in all the great divisions of the Mollusca except the Polyzoa and Brachiopoda. The essential feature of the molluscan kidney is the deposition of a quantity of urinary secretion on a free surface, which in all aquatic Mollusca is, by some means or other, freely bathed with water. In Phallusia, for instance, minute rounded sacs, each clothed with a delicate epithelium, and containing one or more concretions, are scattered over the intestine immediately beneath the lining membrane of the atrial cavity. It is probable that the constant current setting through this cavity carries away some portion of the secretion; but the greater part seems to remain, and eventually coats the whole parenchymatous surface of the atrium. Here the secretory part of the apparatus appears to be out of proportion to the excretory. In the Pelecypoda and Heteropoda the reverse relation would appear to obtain. In these animals, in fact, the concretions have not yet been detected; but the excretory apparatus is an elongated sac, which opens at one end by the side of the anus, and at the other communicates with the pericardial blood-sinus. The sac contracts rhythmically and with great rapidity, so that the blood in contact with its delicate walls must be very effectively washed. How far this internal communication with the blood-sinusules is available for the same end, is not at present understood. In the Lamellibranchiata (at least in Unio) the pericardial sinuses is connected anteriorly with the ventral cavity of the branchial sac—the glands of Bojanus—in which a great quantity of concretionary matter may be detected; on the other hand, the outer surfaces of these glands lie in a cavity which admits the water freely by an opening placed anteriorly close to the genital aperture. This cavity clearly corresponds with the coelomate sac of the Pelecypoda and Heteropoda, but no evidence of contractility has yet been observed in it, or in the renal organ itself. Kefer also denies that any direct communication exists between the interior of the kidneys and pericardial sinuses. Nevertheless, it is impossible to be sure of this. However this may be, the arrangement of the kidney in Unio is very interesting, from its close analogy with what obtains in the Cephalopoda, where the 'serous cavities' or the space between the outer and inner layers of the spongy venous appendages attached to one of their walls, correspond exactly with the excretory sacs of the Lamellibranchiata, while the spongy appendages themselves are but the glands of Bojanus in another form. Our limits will not permit of the description of the structure of the renal organ in Nudibranchiata and Pectinibranchiata, but it might readily be shown to resemble in all essential points that of the Lamellibranchiata and Cephalopoda.


D system, essentially a small ciliated pouch placed between the oral end of the hypopharyngeal band and the
show that the intestine extends into the great abdomen thus developed; that it acquires herewith a neural texture; that the tentacles are produced from the margins of its oral aperture; and that the pharynx acquires a large proportionate size.

In the Ascidioidea the neural region remains in a like rudimentary condition, the basmal region undergoing a similar disproportionate growth; but it is next to impossible to ascertain from the study of development whether this hemal outgrowth is formed behind the anus or before it, inasmuch as the intestine has acquired its complete hemal flexure when its parts are first distinguishable.

In the youngest state in which the different organs are distinguishable, the intestine is almost entirely bent up on to the hemal side of the body; the pharynx is a wide cavity (not wider proportionally however than that of a Polyzoa); the tentacles spring from its margin in exactly the same relative position as in a Polyzoa, and there is no atrial cavity. By degrees the pharyngeal cavity enlarges still more, the tentacles remaining comparatively rudimentary (fig. 12, v. 2). Contemporaneously with these changes, the end of the intestine becomes more and more bent down towards the neural surface, and a cavity, which in another Mollusc would be the mantle-cavity, appears around its extremity; a single or two lateral apertures (subsequently uniting into one) are soon formed, and allow this clausal portion of the atrial cavity to communicate with the exterior. At the same time the atrium extends on each side of the enlarged pharynx, detaching it from the side of the body, and enveloping it just as a serous sac invests the surface of a viscera. Ciliated apertures (at first one or two only on each side) now pierce

the wall of the enlarged pharynx, and increase in number until they form a pouch, the branchial sac. Finally, it depends upon the proportional development of the branchial sac, and of the post-abdomen, whether the adult Ascidian shall belong to the Branchial or to the Intestinal subtype.

Unfortunately, we hardly anything of the development of the Branchiopoda; but so far as the Polyzoa and Ascidoida are concerned, it is obvious that the hypothetical modifications of the Archetype do in fact faithfully represent the actual course of development. (See however the remarks, further on, in this connection of the newest-embryon ongrowht in herm Malloccasida and Molletus.)

Development of the Neural Moluscus.—The Lamellibranchiata.—The first step towards the production of the organs from which the lamellibranchs are known, takes place in the development of one portion of its surface into a disc with mixed edges, provided with very long cilia (fig. 12, r. 1). Next in the inner substance of the germ the intestine appears as a solid mass, bent upon itself, towards what the eventual development of the foot proves to be the neural surface; its oral portion being placed immediately behind the ciliated disc (2).

Finally, the hemal surface behind the ciliated disc gradually gives rise to two of the lobes of the mantle, upon each of which is a thin transparent pellicle, the first rudiment of the valve or valves of the molluscan shell. As development proceeds on the neural surface between the primarily approximated oral and anal apertures becomes converted into the large foot and mesosoma of the Lamellibranchs, which serve to lodge the primary shell; the abdomen never becomes developed into a great process as in Gastropoda. The great posterior adductor makes its appearance on the neural side of the intestine, and by its development the latter is thrown up so as almost to appear to have a hemal flexure. The gills next appear as processes of the body within the neural cavity, and therefore have not the remotest homology with the pharyngeal branchial sac of Ascidians, any more than the two aphponal apertures are essentially dependent upon the union of the two lobes of the mantle with the gills and with one another have anything to do with the oral and cloacal apertures of the Ascidians.

Finally, it is said that the ciliated disc becomes metamorphosed into the labial palpi. This is a point well worthy of further investigation; for the arrangement and form of the appendages in Pecten leads us strongly to believe, as we have said, that they are the homologues of the tentacles in the Aplaculidea and Polyzoa. On the other hand, there can be no doubt that the ciliated disc of Lamellibranchs is homologous with the ciliated disc of the gastropod embryos; and if these, there is every reason to believe, are nothing but the specially modified anterior portion of the epipodium. The tentacles of the Polyzoa would thus come to be the homologues of this ciliated disc; but the entire chain of reasoning obviously depends upon whether the ciliated disc does or does not become metamorphosed into the palpi—a position which the more requires confirmation as in the gastropods the ciliated lobes are now known entirely to disappear. How far this be what has been stated with regard to the main steps in the development of the Lamellibranchiata fully confirms the hypothetical derivation of the type from the Common Plan.

Pteropoda and Pulmonata.—In the primary stages of their development no important distinction is to be drawn between the members of this division and those of the last, except that in the Pteropoda the ciliated disc is replaced by two ciliated lobes, one on each side; and in the Pulmonata empty shell sac is replaced by a solid "hemal sac." The primary neural flexure of the intestine in the Pulmonata, and the development of their mantle in front of the anus (that is, the development of an abdomen), are fully demonstrated by the observations upon their embryology. It is important to remark, that in the Pteropoda the ciliated lobes of the embryo do not become the lateral alae of the adult form, but are a portion of the anterior part of the epipodium, which usually disappears in the adult.

It is therefore evident that the development of the mesosoma, as a mass of cartilage, begins much earlier before leaving the egg, and the modifications which its primary form undergoes are extremely instructive. The first organ of the Cephalopod which appear on the larva are (fig. 12, r. 1) the mantle, which is simply a thickening in the middle of the ciliated disc, with somewhat raised edges; around this is a surface representing the mesosoma and foot, at one end of which is the mouth, and at the other or anal extremity are placed two lateral lobes, the remnant of the disc. As development proceeds, each side of the mantle the mesosoma is produced into a longitudinal ridge occupying the precise position of the epipodium.

As development goes on, the hemal surface occupied by the mantle grows out, and becomes a prominent sac, whose free edges of the mesosoma are somewhat more or less elongated, in a direction anteriorly, but for the almost the whole length of the sac posteriorly, give rise to the mantle cavity (v. 2). The intestine passing into the abdomen thus forms more and more bent upon itself, until at last it has nearly made the circle.

With all this the epipodium, remaining rudimentary in its anterior region, becomes a free process on each side posteriorly (representing for a time the alae of a Pteropod), but after a while these processes become reduced to the siphonal canal, the Funnel. In one of the other changes undergone by the margins of the foot are not less remarkable; they are produced from behind forwards into four or five digitations on each side, the anterior pair of which stretch in front of the mouth and unite over it; the digitations elongate more and more, and the mouth is in consequence at last placed in the centre of a sort of inverted cone, formed by the foot and its prolongations—the aceta-

buliferous arms (iv. 3).

Such may be taken as a very short abstract of Professor Kollmann's 'Entwickelungs-Geschichte der Cephalopoden,' and it is needless to point out that it is our hypothetical process of modification of the Archetype into the Cephalopod type, in other words.

The point still necessary to consider the development of the separate families of these Moluscas, as the process, as far as we know, is the same in all. We will take that of a Nudibranch (Antiope cristata) as a type, having recently had occasion to go over it with especial reference to the points here considered the animal.

The end of the process of yelk-division (which, we may remark in passing, results, not in the formation of 'nucleated cells,' but simply in that of smaller and smaller packets of yolk-granules) in this Moluscus, is the formation of a blasto-

Derma, and from the rudiments of the mesosoma the whole embryo next becomes more or less bell-shaped, a sort of rim, with very long cilia, appearing at the broader end, while a minute prominence is seen at the opposite extremity (iv. 1). A straight line drawn from this prominence to the centre of the surface, surrounded by the rim, would have the body of the creature symmetrically disposed around it. On the one surface is a deep pit, formed by the edges of the blastodermic layer; on the opposite a delicate transparent mantle sac is formed, the remainder of the animal. The position of the hemal surface and mantle appears (iv. 3). By degrees the hemal surface becomes more and more promi-

nent, and the shell larger. With this the prominence of the mantle sac grows larger and larger, its shape is changed; the rim becomes more and more laryngeal—so that its position becomes quite asymmetrical (iv. 3, 5). At the same time the ciliated rim from being circular is produced laterally into a lobe on each side—the ciliated lobes; the metapodium makes its appearance behind these as a small prominence; and a delicate operculum is formed between the metapodium. The aperture of the mouth may now be observed behind the ciliated lobes and between them and the metapodium; and the internal substance of the germ is seen to present the outlines of an alimentary canal, consisting of a rounded gastro-haeumatic mass and a narrow intestine, which turns abruptly forwards and upwards, to end on the right side more or less lamellate in the before-mentioned prominence, whose position has become thus extensively expanded.

Two things are obvious in this series of developmental changes. In the first place, the primary symmetry of the embryo; secondly, the gradual asymmetry brought about by the development of that portion of the body which bears the shell, and which is a portion of the hemal surface.

Now this is perfectly in accordance with our hypothetical derivation of the Hemal Moluscus from the Archetype, and is the only point which remains to be proved, that this over-

development of the mesosoma is a result of the presence of an abdomen, that is, as a post-anal portion of the hemal surface.

This view has been taken in deriving these forms from the Archetype; and has been absolutely necessary, and has thus been proved by the presence of an abdomen, that is, as a post-anal portion of the hemal surface.
tion of the haemal outgrowth in the Haemal Mollusca may not be a secondary production, the result of a gradual twisting to one side and backwards of a primarily pre-anal outgrowth of the haemal surface. The facts just detailed with regard to the development of Antiopea would favour this view; but, on the other hand, sufficient attention has not been paid to the process of development of other Gastropods to decide whether it is in these respects identical with that in the Mollusca. The structures of the majority of adult Pectinibranchia and Peripods would lead one to believe that in these forms, at any rate, the haemal flexure has been direct and primary; and it may be that a careful comparative study of development in the Pectinibranchia and Nudibranchia will lead to the translation of the Nudibranchia to the Neural division, the final haemal flexure turning out to be a secondary modification. In the absence of sufficiently conclusive studies of this kind, however, we prefer to be guided by structural considerations, and hence to retain the Nudibranchia provisionally along with the Molluscs with a haemal flexure. It will probably be granted that the doctrine of a Common Plan among the Molluscs, which has been advanced, will have some value as a guide through the masses of their varying organisation—even although the details of this first sketch should turn out to be even in many points erroneous.

MOLOSSUS, [Chitipetra.] MONAZITE, a mineral with the following composition:

| Oxide of Cerium | 28.00
| Oxide of Lanthanum | 23.40
| Thoria | 17.95
| Phosphoric Acid | 28.50
| Oxide of Manganese | 1.90
| Oxide of Lime | 1.70
| Total | 101.50

It occurs in modified oblique prisms. It has a perfect and brilliant basal cleavage. It is only found in small imbedded crystals. It has a brown or brownish-red colour; substances of a similar appearance, but of a very different inclining to resinous. It is found near Platsow in Russia.

MONK, DR. JAMES HENRY, Bishop of Gloucester and Bristol, was born in 1784, and received his early education at Norwich Grammar School and the Charter House. He subsequently entered at Trinity College, Cambridge, of which he became Fellow and Tutor. In 1808 he was chosen to succeed the celebrated Richard Porson as Regius Professor of Greek in the University. It was mainly owing to his efforts in the establishment of the classical department at Cambridge that a Pitt Press was founded. As a scholar of Porson's school he is best known for his editions of the 'Aesopica' and 'Hippolytus of Euriptides, and in the literary world for his 'Life of Bentley,' and the 'Adversaria Bamptonica.' He was appointed Deacon of Peterborough in 1854, and consecrated Bishop of Gloucester in 1830; the see of Bristol was added to his charge in 1836. He died June 6, 1856.

MONKEY-FLower, [Mimus., S. 9.]

MONRADITE. [Minerol., S. 1.]

MONSTROSITY, a term applied to those anomalies amongst plants and animals which present any irregularity in their general form or the form of the organs of which they are composed.

The term Monstrosity is often applied to those anomalies only which are apparent externally, and which produce more or less deformity; but, in a scientific point of view, it includes every variation, either external or internal, in any organ, from its most general or natural formation; and it is in the latter sense that we shall here treat of it.

Monsters were formerly regarded as sports or prodigies of nature, and these ignorant notions, with respect to their true characters, were prevalent among all classes of people until the commencement of the last century, and are even now held by the uninformed. By the physiologist however the study of the various anomalies of organisation in plants, animals, and man, are now viewed as a branch of natural science, and the monstrous development of plants and a minute acquaintance with embryology and structure, have shown that the formation of these different imperfect beings is governed by the same laws which preside over the formation of perfect individuals; the only difference being, that the process of development in the former cases has been perverted, or arrested, or increased in its course during the growth of the embryo or germ.

Monstrosities in the animal kingdom are treated of under the head Monstrosa. We shall give there a brief account of monstrous growths in plants. The study of such growths is not a mere matter of curiosity, as their structure tends not to throw light on the true laws of development amongst plants. Although direct observations are more easily made on animals than on plants, by noting in the latter the facts of their history during growth, it is nevertheless interesting to obtain a confirmation of these facts from the forms which monsters assume, these forms in some way resembling parts of the plant at the stages of growth through which plants pass. In these forms nature presents us with as it were experiments to test the truth of the general laws of morphology.

This subject can perhaps be best illustrated by reference to special instances. To begin with the Leaves. [Lancet.] In the history of the normal development of the leaves, it is found that they are always arranged in an alternate manner, one leaf above the other, but subsequently in many plants, and even families, the leaves become opposite or whorled. In the case however of individuals it is not infrequently happens that the leaves of opposite or whorled-leaved families of plants become alternate. Thus an instance is recorded of Hippuris vulgaris (Mare's-Tail), which in its normal condition has whorled leaves, its leaves arranged alternately in a spiral upon the stem.

In the conversion of the leaf-bud into the flower, one of the earliest changes that takes place is the conversion of the leaves into the organs called Bracts. [Baec.] Instances are very often seen of monstrous forms of plants in which the leaves are not converted into bracts but retain their leaf-like character. This anomaly occurs in the species of Plantago, giving the inframarginal suture a different character to that which occurs under normal circumstances.

The leaf-bud is always seated in the axil of the leaf, but in the case of the bracts forming the involucre of the Cones, the axis is not divided, the flower-buds being united in their axils; but in the case of the monstrous variety of the common daisy (Barn.), known by the name of Hen and Chickens, flower-buds are developed in the axils of the bracts.

Next after the bracts the Sepals are formed in the flower-bud. [Lancet.] It not uncommonly happens that during the growth of cultivated plants, the sepals are found assuming the appearance of leaves. This is especially the case with the cultivated roses. This tendency to recur to the condition of the leaf is seen in the case of Calceolaria, in which the petals are not joined together, and the corolla is of a much greater length than the calyx. Thus, in the case of Calceolaria, the sepals are borne on the lower part of the sepals which thus produces the peculiar character of these fruits, such as the gooseberry, the currant, the apple, and the pear. In these fruits it is not uncommon to find amongst them leaves growing from the surface of the fruit, indicating the tendency of this sepallary part of the fruit to assume the condition of the leaf. The most remarkable example of this tendency of the sepal to assume the condition of the leaf has been observed in the Goat's-Bead (Tropaeolum), in which in one particular case the minute flower which represents the calyx has been found to have assumed the character of the leaf.

It frequently happens where one of the parts of a flower have a tendency to relapse to the foliar condition, that the whole of them partakes of this character. Thus Mr. Austin has recorded very accurately the changes observed in a monstrous form of the White Clover (Trifolium repens), in which in one particular case the minute flower which represents the calyx has been found to have assumed the character of the leaf.

1. Calyx.—This is the most frequently of all the leaves, but when compound leaves are formed the division seems to be as follows: the two large equal teeth, which are opposite the vixillum, form one serrate leaf, and another leaf is formed from the three remaining teeth.

2. Corolla.—It is most frequently reverted to a leaf is the vexillum, and this is a perfect one. Of these leaflets, the als are often seen forming simple leaves, as also the carina; but their perfect union into a ternate leaf is less common.

3. Stamina.—Whatever changes the flower may exhibit,
these organs are always in a state to be recognised, and their reversion to leaves less frequent than in any other part; so that there is more difficulty in determining the number of leaves which go to form this portion. As two ternate leaves form one, it might be supposed that two members of the stamens were constructed out of the same number. The figures represent cases of a stamen reverting to a leaf with a true stamen attached to its stalk on either side; the single anterior stamen, where it reverts, seems always disposed to form a pair of leaf; and it is therefore probable that the ten stamens (9–1) may be formed out of four sets of ternate leaves.

4. Pod.—From the well-known character of the pod and pistil of the common snail, it might be supposed that instead of reversion to leaf would be most frequent in this part of the flower; and a series might easily have been produced which would have represented it in every stage of passage; some of these were given. From these it would appear that the pod is not formed of a whole compound leaf, as either two scales, or two abortive leaves, are constantly to be seen at the base of the imperfect pod on either side; the pod is therefore usually formed out of the middle leaflet. In one flower-head however each division of the pistil-leaf had become a pod, with a distinct stem and the ovules upwards. 

"Ovules seem to be produced only when junction of the edges of the pistil-leaf takes place; in other cases leaflets are produced in the place of ovules.

"The only other part of the floral series has been regularly developed, the Pistil occasionally will take the form of a perfect ternate leaf, and then the axis of the plant is continued through the flower." (Austen, 'British Taxonomy of the Report,' 19th meeting.)

Mr. Astley's last work was a paper read in the same place an instance in which the staminiferous flowers of the Common Maze (Zea Majus) were converted into pistols. In this case we have an instance of the tendency of an organ not to revert to a lower type, but to assume a higher type of development.

It is very frequently the case that stamens relapse to the condition of petals. This is the case with most of the double flowers of our gardens: and in the case of the rose, the peony, the narcissus, and other flowers. Anthers may often be found tipping the petaloid bodies in the centre of the flower. This is seen as a normal condition in the water-lily.

The recurrence of the pistil to the form of the stamens and corolla is not so frequent, as its assuming the form of the leaf. In the double cherry of our gardens this condition of the pistil is frequently presented. It is this same tendency which is seen in monstrous oranges, in which this fruit is spilt up into a number of parts as it possesses carpel-like leaves. [FLOWER.]

The most central organ of the plant is the Seed, and its development is the great object of the production of the flower. The young seed is however but a changed bud, and during the process of its development it sometimes recovers to the condition of the leaf-bud, and produces instead of an embryo a branch.

These instances will be sufficient to show how instructive the study of vegetable monstroussities really is. Many such each have been recorded, and one of the best resumés of the whole subject will be found in Moquin Tandon's 'Teratology Vegetabilis.' [METAMORPHOSIS OF UOANAE.]

MONTAGU, BASIL, Queen's Counsel, was born April 24, 1770, in London. He was a natural son of John Montagu, 2nd Earl of Bristol, and was brought up in his house. His mother was Mrs. May, who was shot in 1779 in the Piazza of Covent Garden, by the Rev. Mr. Hackman, who had fallen in love with her, and destroyed her in a fit of jealousy frenzy. Basil Montagu received his early education at the Charterhouse School, London, of which the Earl of Bristol was governor. He afterwards entered, in 1792, a Fellow of Gray's Inn, and was sent to the University of Cambridge, where he was soon distinguished for his love of literature, and where he remained till after he had taken his degree of M.A. His father died in 1799, leaving him a competent income, of which he made the best use. He was called to the Inns of Court, and was made a Barrister of Lincoln's Inn. After some years' study of the Law, he entered the practice of Chancery. Having selected the Law as a profession, he entered himself of Gray's Inn, where he was called to the bar in 1798, but some years afterwards he became a member of the Inner Temple. He was an active and influential member of the Chancery Bar, and a most zealous advocate of the opinions of Godwin that he had serious thoughts of relinquishing the profession of a lawyer, as 'injuries to society in proportion to the power and attainments of the individual.' James Mackintosh, however, with whom he traveled for some years on the Norfolk circuit, convinced him that the dignity of Godwin was not founded in truth, and he continued in the legal profession. He was a man of great talent, but having devoted his attention chiefly to the bankrupt laws, acquired a high reputation and good practice in that department.

His first work was 'A Glimpse of the Law of Set-off, with Particular Consideration of Cases heard and determined in the Courts of Law and Equity upon the Subject,' 8vo, 1801. It had not appeared many weeks before it was noticed with approbation by Sir Vicary Gibbs, who thus extended the practice of the young lawyer, then almost unknown. His second work was a paper read in the House of Commons, on the Appeal of Inhabitants to the High Court of Chancery, with a Collection of the Statutes, and of the Case argued and determined in the Courts of Law and Equity upon that Subject, 4 vols. 8vo, London, 1803, 2nd edition, 1811. This 'Digest' became a standard work, and many other editions of it were published. He published also 'Law and Practice in Bankruptcy,' 2 vols. 8vo, with 'Supplement,' 1 vol.; 'The Law of Partnership,' 8vo; and 'The Law and Practice of Parliamentary Elections,' in one vol. For this work he was assisted by other legal works and compilations, partly in his own name, partly in conjunction with others, are too numerous to be quoted. Lord Faskine, during his brief tenure of the office of lord chancellor (1806-7) made Mr. Montagu a commissioner of bankruptcy. While holding this appointment, and deriving a considerable income from it, he became so convinced of the delay and expense to litigants of this mode of administering the law, that he published a yearly detail of these injuries. He was afterwards a member, together with Mr. T. Buxton, of a Committee of the House of Commons, finally put as an end to those commissions. A new law was made (1 & 2 Wm. IV. c. 50), under which three judges constituted a Court of Review, and six commissioners exercised functions similar to those of the former; but personally exercising the judicial functions of judges under the great seal. Mr. Montagu was very much dissatisfied with the new law, but he accepted the office of accountant-general in bankruptcy, which he held during ten years. While in this office he demanded from the governors of the Bank of England interest for the bankruptcy moneys in their possession, which had never previously been paid. His demand was at first resisted, but ultimately he obtained 20,000l. for the bankruptcy fund.

This and other negotiations in which Mr. Montagu is best known to general readers are the following:—Selection from the works of Taylor, Hooker, Hall, and Lord Bacon, with an Analysis of the Advancement of Learning," 1802. The analysis is carefully executed, and very useful for those who wish to study Lord Bacon's treatise. 'The Opinions of different Authors on the Punishment of Death,' 3 vols. 8vo, 1809-13. In furtherance of these 'Opinions,' he formed a society for the diffusion of knowledge respecting the punishment of death and corporal punishment, for the abolition of hanging for forgery and other crimes without violence, in conjunction with those of Sir Samuel Romilly, Mr. Wilberforce, and others, and were at length rewarded by complete success, and the great bill sent to the King by a Water-Drinker,' 8vo, 1814. 'The Works of Francis Bacon, Lord Chancellor of England,' 16 vols. 8vo, London, 1825-34. This work was commenced while he was at the university by the translation of Bacon's Latin works, in which he was assisted by Archdeacon Wrangham and others.
MONTAGU. — (Barry Moore, 2d.)

MONTAGU, JAMES, was born at Irvine in Ayrshire, where his father was a Moravian preacher, on November 4, 1771. When only four years of age his parents removed to Grace Hill in the county of Artrim, Ireland, where he was first placed at school. In 1776 he was sent to the University of Edinburgh, and in 1780 to the University of Ayr- shire, to complete his education, and in 1783 his father and mother went to the West Indies as missionaries, where they died in 1790. At Falmouth the instruction was excellent, but the slave life found the young man, at his ten years’ residence there, distinguished himself for nothing "but indolence and melancholy." He had taken a fancy for poetry, which was utterly forbidden in the school; he had clandestinely read ‘Robinson Crusoe,’ which had greatly interested him; and he wrote, when only thirteen, some poor imitations of Moravian hymns. Thoroughly characterised by his teachers as indolent, he had contrived to procure and read a copy of Cowper’s poems, and these he thought he could excel; so he wrote a mock-heroic poem of a similar kind, called ‘The World,’ and this before he was fourteen. He also wrote other small poems; but his teachers, who wished him to become a Moravian preacher, were dissatisfied with his inattention to his studies. In the school-diary of July 3, 1787, it is recorded that, as "J. M., notwithstanding repeated admonitions, has not been more attentive, it was resolved to put him to a business, at least for a time." A situation was soon afterwards found for him with a shopkeeper at Milford. He was afterwards given a great deal of work, knowing that he continued to write poetry and compose music till June 1798, when he ran away. He had only a trifle of money when he started; but on reaching Wentworth, he presented his poem to the Earl of Eldon, who gave him a guinea. He then settled for a twelvemonth at Wath-upon-Dearne as assistant in a general shop. The brethren at Falmouth discovered him, and wished him to return; but he refused. He continued in this situation, silent and recluse, but no doubt pondering over thoughts for which as yet he wanted fitting powers of expression.

He continued to write, and at the end of the year having sent a volume of manuscript poetry to Mr. Harrison, the publisher at Patermoor-row, London, followed it himself. Mr. Harrison declined publishing the poems, but engaged him as shopman. In London he led the same solitary and retired life as in the country. His sole amusement was writing, and he is stated to have never entered a theatre, or even the British Museum, to which he might have thought his habits and disposition would have led him. While in London his first production, a tale in prose, entitled ‘The Chimeras,’ appeared in ‘The Bee,’ an Edinburgh periodical work, in November 1791. He also wrote a novel, which he offered to Mr. Lane, of hinemoa-plems celebrity, who declined it, because the characters swore too much. The novel was never published, but the objection greatly hurt the religious feelings of Montagu, who thought he had only imitated Fielding and Smollett, and was disappointed at not being taken up by the old story-tellers. In the summer of 1792 he returned to his old station, as supercargo at Wath. He did go, but not to remain long. Towards the end of 1792 (having replied to an advertisement for a clerk), he entered the service of Mr. Joseph Gales of Sheffield, who was printer, bookseller, auctioneer, and editor, publisher and proprietor of a newspaper, ‘The Sheffield Register,’ which advocated principles at that time designated as revolutionary.

Montagu formed an attachment to his employer; wrote political articles for the paper; and when Gales, learning that a warrant was out against him, fled to America, started a new weekly paper, on “peace and reform” principles. The first number of ‘The Sheffield Iris,’ appeared on July 4, 1794, which he continued to edit till September 1795. It maintained its existence, with a few changes, till January 1797. This Iris was at first very successful, but it was a singular position for Montagu to fill, with his recluse habits, his mild and almost timid feelings, his dislike to the practical details of business, yet his success, even to the point of his being taken up by the police, so: “I hate politics,” he said, “and would as soon meet a bear as aledger." Almost immediately after starting the newspaper, a poor man employed him to print a few quires of a ballad, for which he was charged eighteen-pence. It was entitled ‘The Comic Wanderer.’ On the fall of Montagu’s Iris he was well conceived; but the attorney-general, Sir John Scott (afterwards Lord Eldon), discovered it to be seditious, indicted the printer, and in January 1795 he was tried at Doncaster, found guilty, fined twenty dollars, and sentenced to three months’ imprisonment. He gave an account in his newspaper of a riot in Sheffield, to quell which the military had been called in and had fired on the people; for this, in 1796, he was again tried, again found guilty of sedition, fined five pounds, and sentenced to four weeks’ imprisonment. During his confinement, which was in York Castle, he wrote a small volume of poems, entitled ‘Prison Amusements,’ which was published in 1797. After his release from prison he returned to London. He was a man of singular shyness, his gentle manners, and perhaps his increasing literary capacity, won him the regard of even his political opponents, and secured him the esteem and love of the rest of his townsmen. He continued to write short poems, several of which are very pleasing; and in 1806 he published ‘The Moravian Preacher,’ a volume containing seven poems, and some other works. All his life he remained a quiet, unpretending person. He lived in London till his death. In 1816 he was presented to the living of Attercliffe in Yorkshire, which he resigned in January 1827.

Montagu’s Life is attested by his poems, but appears less than a complete one; his only remaining work is the volume of poems published in 1827. It contains some of the best in his writings, which are, in general, simple and unaffected. His style is neat and convincing, and his fancy sparkles; but his sympathies with all that is good and holy are ever ardent and sincere; his pathos is touching, and his style melodious, though in his longer poems occasionally too ambitious and magniloquent. Such faults as these are least likely to occur in his shorter poems; and in some of them, as ‘The Common Lot,’ and ‘The Prayer,’ they entirely disappear.

We have pursued Mr. Montagu’s poetical career to the end in order to give a collected view of it. We now return to the few remaining events of his life. His publication of ‘The Wanderer in Switzerland’ led to an engagement on the ‘Ecclectic Review.’ He had few qualities for an able critic—indifference, or at least the feeblest of talents, his praise or blame depended more upon his feelings than his judgment of the character of the work or its literary attributes; consequently one of his earliest reviews was an onslaught on Moore’s early poems, whom he termed in a private letter a ‘false liberal seducer.’ This feeling led him later in life to decline being introduced to Moore, who sought 3 K
his acquaintance. In 1825, as we have said, he resigned the editorship of the 'Iris,' on which occasion a public dinner was given to him by the inhabitants of Sheffield, and funds were subscribed to establish a mission-station in Tobago, which was afterwards conducted by James Moore. Whittington died at the Royal Institution on the 'History of English literature,' a subject on which he was not well qualified to speak, and which therefore fell somewhat dull and flat. Later in the year he published 'A History of Missionary Enterprise in the Nineteenth Century,' a work which he thought was 'an interesting and valuable work.' In 1833 he absolutely declined the office of Professor of Rhetoric in the University of Edinburgh; and in the same year a pension of 150l. was bestowed on him by the Queen, through Sir Robert Peel. In 1836, after having lived forty years in the house occupied by his old employer, Gales, with three of Gales's daughters, who kept the bookseller's shop, on the death of one of them he removed, with the remaining two, to a more convenient residence; and in the same year he delivered a course of lectures 'On the British Poets,' at Newcastle-on-Tyne; and for some years added to his income by delivering similar courses at other places. In 1841 he visited Scotland on a missionary tour. He was received everywhere with great distinction, particularly in the town of Edinburgh, where he received the public reception, and was made a burgess. In 1842 he visited Ireland on a similar errand, saw his old abode at Grace, and while occupied in these religious labors of charity, he was ordained a Moravian minister. In 1852 he delivered a lecture on some Passages of Enion Poetry but little known,' but was so feeble as greatly to excite the compassion of his audience. On April 30, 1854, he died; and on the day of his burial the shops and manufactories of Sheffield were closed, and the whole of the municipal authority, including the mayor, was present. Gales was buried at Sheffield, in twenty-four clergymen. By his will he left 900l. to be distributed to various charities. His memoirs have been published in seven octavo volumes by John Holland and James Everett, to which we have been indebted for most of the facts in this notice.

MONTGOMERY, ROBERT, was born at Bath in 1807. Of his boyish years we know nothing, but he appeared before the world as an author at an early age, conducting in his native city a weekly publication called 'The Inspector,' which had but a short existence. His next publication was 'The Stage-Coach,' dated 1827 in his collected works; and in the same year he issued 'The Age Reviewed: a Satire, and its sequel,' a work which was well received and well rewarded with notes. The work was very delicately directed against irreligion and scepticism, and this has formed the key-note of all his subsequent poems. In 1836, though stated to have been written in 1829, he published the poem 'The Omniscience of the Deity;' it became astonishingly popular, and eight editions are said to have been sold as many months. In the same year appeared another volume, 'A Universal Prayer; Death; a Vision of Heaven; and a Vision of Hell;' a second edition of which appeared in 1839, dedicated to Sharon Turner. 'Satan' quickly followed. All were successful; and encouraged by this success, and the advice and assistance of Mr. S. Turner and the Rev. W. L. Bowles, he entered Lincoln College, Oxford, with the intention of devoting himself to the Church of England. He graduated B.A. in 1833, passing in the fourth class, and M.A. in 1838. His residence at the university provided him with a new subject for his prolific muse, and in 1831 he produced a poem, with historical notes and engraved embellishments, under the title of 'Oxford,' which, though extremely laudatory, was so much controversy and bitterness of spirit that he resigned the incumbency, and returned to London, where he immediately published 'Luther, or the Spirit of the Reformation.' In October 1845 he resumed his ministry at Percy-street Chapel, where he continued till his death. He then began the publication of a number of prose theological works, the issue of which was continued till 1854. Neither was poetry altogether neglected. Besides some smaller works, he wrote several poems during this period, some of which may be found in the 'Works,' subjects, published by Fisher; 'Sacred Meditations and Moral Themes,' 8vo, 1847; 'The Christian Life, a Manual of Sacred Verse,' 12mo, 1849; 'Lyra Christiana—Poems on Christianity and the Church,' 32mo, 1851; 'Lines on Well-Wishing to the Royal Family,' 1842; and 'Devotions in the Christian Sanctuary, A Companion in Verse for the English Prayer-Book,' 1855. On December 3 of this year he died at Brighton, in his forty-ninth year, all his exertions in the cause of religion having been unrecognised by any prevenient in the Church.

That Montgomery's poetical works should have been so successful as they undoubtedly have been, has excited much surprise. As early as 1830 Mr. Macaulay, in noticing a third edition of 'The Omniscience of the Deity,' in the 'Edinburgh Review,' ascribed the poet's success to publishing paffery. That his works have been most inordinately praised is certainly true; but no amount of puffery would have carried a poem through twenty-six editions (which the 'Omniscience' has passed through) if it had not really possessed certain excellencies. But these may be found in the gravely important nature of the subject he has generally chosen, and the class, a numerous one, which he peculiarly addressed. This class, rejecting poetry usually as secular or profane, were pleased by his meditative and stimulating style, by his thoughts which was earnest and sincere; and, prejudiced in his favour, to them his turpitude appeared eloquent, his obscurity assimilated to the mysterious, his vagueness kept him clear from most points of doctrinal difference from them. Montgomery was an inartistic man, often selected without taste and scattered without fitness, kept attention alive; and as in so voluminous a writer it would be scarcely possible not to find some passages containing good thoughts happily expressed, these were pronounced as answers to opposing critics. As a preacher he drew large audiences, and his services were often asked and given in favour of charitable purposes. His style of preaching; in some measure resembled that of his poetry; he was not affected and was grave; but his discourses were accepted as earnestness, his affection as refinement, and his vagueness as a happy generalising. His manners were engaging, and he always acquired the esteem and regard of his congregations, who on more than one occasion gave him substantial marks of his esteem.

MONTICELLITE. [Mineralogy, S.1.] MOORE, THOMAS, was born in Angler-street, Dublin, on the 28th of May, 1779. His father was a small tradesman, and both his parents were Roman Catholics. He was early placed in a private school, and was induced to turn his attention to eloquence, who was fond of dramatic representations, and in whose school R. B. Sheridan had once been. Moore, a quick and lively boy, became a favourite pupil, and as early as 1790 exhibited his talents in reciting an epilogue at a private theatrical entertainment; other dramatic exhibitions were got up by his parents, for which he wrote epilogues or prologues. When he first began to rhyme, he says, he cannot remember; but in 1793 he contributed two poems to the poem 'Nestor,' and in 1795 he was appointed one of the judges, which were inserted, to his intense gratification. In this year the restrictions which prevented Roman Catholics from studying at the Dublin University were removed, though all honours and offices were still denied them. His mother, who wished to be a Roman Catholic, petitioned to enter him at Trinity College in the summer of 1794. At college he pursued the usual studies with tolerable success, gaining several marks of distinction, though, feeling an habitual dislike to the society of his college companions, he went off almost daily to the Dublin coffee house to spend his evening in the society of his friends. In 1796 he published 'An Occasion Speech,' which was approved of by the judges, and for which he received a reward. He continued to write verses for the 'Anthologia' and other periodicals. In 1798 he was elected to a fellowship of the college, and was to have been rewarded for the Ire. With the permission of his father, he went to London to take his degree, and he then became a practising advocate in the courts of Chancery and Common Law, and was in January 1804, 1842. He quit Whittington in May, 1818, and became minister of Percy-street chapel, London; whence he removed, about the beginning of 1836, to St. Jude's episcopal chapel in Glasgow. Here he continued until December 1849, drawing large audiences; but his preaching excited
Born a Roman Catholic, accustomed from infancy to hear the
wrongs of his fellow-religionists descanted on, influenced by
his father's piety, and confirmed in all his habits by the
education he received at the University of Dublin. After
serving by his pretensions to a scholarship in the University
being unavailable on account of his faith, it is little to be
wondered at that he took a lively interest—though fortu-
ately he was too young to be made an ascetic convert—
and pursued the latter vocation. He was examined before Fitzgibbon, the vice-chancellor; but as he
could honestly avow himself ignorant of any plot, he was
discharged. He at length took his degree of B.A., and left
the university; but he had already commenced translation
of the so-called odes of Anacreon, a specimen of which he
blew along the rent of the college, Dr. Kearney, with a
hope to obtain a classical premium. Dr. Kearney thought
the translation good, but that the subject was not likely
to be advantageous to the student. He, however, sent him, in
Middle Temple in London, whither he went, scantily
supplied with money, to study law. In London he was
introduced to Lord Moira, Lady Donegal, and others; he moved
in a fashionable circle; he published in 1801 his 'Odes
of Anacreon'; and of course paid little attention to his
legal studies.
His next publication, in 1802, was 'The Poetical
Works of the late Thomas Littke,' for which he received
60L. They were severely blamed and much read, and their
sentiments were held up to ridicule, for they were
friends, on account of their poetical ability. In 1803,
by Lord Moira's influence, he was appointed to a govern-
ment situation at Bermuda. In January 1804 he arrived
there, having stayed upwards of a month at Norfolk in
Virginia, the residence of Lord Nelson, and desiring to see
him, and in March he left Bermuda, appointing a deputy
to fulfil his functions. He then journeyed over a part of
America, going from New York to Virginia, and back by
Philadelphia and Boston to Niagara and Quebec. He
saw the society in America he was much dissatisfied, and recorded
his sentiments in some satirical poems. In November 1804
he was back in England. Here he expected much from
Lord Moira's patronage, but only succeeded in getting the
appointment of deputy-postmaster in Bermuda, which
was abolished.
In 1805 he published 'Odes and Epistles,' which being
in a similar style to the Little poems brought upon him the casti-
gation of Jeffrey. This occasioned a bloodless duel, the
cuffle of much moment at the time, and led to a firm
friendship between the combatants. He was now leading a
life of fashionable excitement among the aristocracy
of England, a visitor to Lord Moira at Donington Park, and a
constant guest at Lansdowne House and Holland House. As
an accompaniment to his fashionable life, he saw
Bunting's collection of Irish melodies, and at intervals he
had written words for several of them, which he was
accustomed to sign himself with much effect. In 1807 he entered
into an engagement with Mr. Power to produce a
work for which he prepared music and furnished
the words, while Sir J. Stephenson was to provide the
accompaniments. This work was not completed till 1834,
and upon it his true fame will rest. His amatory poems,
though swiftly and playfully written, will always give
to persons of good taste; his satires, however suc-
cessful in attacking ephemeral subjects, will perish with the
events to which they allude; but the melodies, combining
beautiful words, purer morals, and good music, will have
a lasting existence. They have an entirely original character;
they have not the vigor, the truth to nature, and the
deep passionate feeling of our other great lyrical poet,
Burns, but they are never, as he sometimes is, coarse; they
have a playful turn of thought, aoadness of manner,
a play of wit, a brilliancy of fancy, and a richness of admor-
ment, which, though often giving the impression of being artificial,
are always pleasing. In the same class may be in-
cluded the songs written under the title of 'National Airs,'
published in 1816. We cannot however place the 'Sacred
Songs,' which he published in the same year, in the same
category. In them there is a strained adaptation of scriptu-
ral words and ideas, with a lack of earnestness, that ren-
der them distasteful. In 1818, he published, anonymously,
two volumes, 'Anecdotes and Observation's,' probably
'The Sceptic.' They were not very successful. Moore's
muse was too sportive, his fancy too playful, his heart too
genial, for him to excel in severe satire which he here at
tempts.
In 1811 he married Miss Bessy Dyke, a truly estimable
woman, to whom he ever continued fondly attached, and who
was the source of all his parent happiness for the remainder
of his life. In the autumn of the same year he goes of
London, and for some months lived in the city. M.P., or
never. He was at first but moderately successful, ran a few nights, and has
never been repeated, though some of the songs, published
separately in his collected works (from which the opera is
omitted), well maintained his lyrical reputation. Moore had
now made his mark, and went and resided with his family at Mayfield Cottage,
near Ashbourne in Derbyshire, where in 1815 he produced the
'Twopenny Post-Boy,' by Thomas Brown the Younger. The
song was scandalous, at least, as 'Outside the Play' was
directed against the Prince Regent and his ministers, made
them immediately popular, and fourteen editions went through
the press in a twelvemonth.
As early as 1812 Moore had contemplated the writing of an
Oriental romance, as he expressed to his friend Mr. Perry of the
'Morning Chronicle' stipulated for him with Messrs. Long-
man, the publishers, that he should receive for a quarto volume
the sum of three thousand guineas: this was agreed to; but it
was not till 1817 that 'Lalla Rookh' at length appeared. It was
eminently successful; it has passed through many editions,
and it has been frequently translated. It may
however be doubted whether it will contribute to his perma-
nent fame. It is brilliant, melodious, in the 'Fire Worship-
ers,' very a good poem, as is its successor, 'The Dividing
Line.' Characterisation, it is untrue to nature, it is cloying with its
sweetness, it is oppressive with its imagery; the feelings
described are almost uniformly sensuous, and the art of the
composition, painfully apparent. Immediately after the
publication of this work he formed a literary partnership
with Mr. Rogers, and this enabled him to produce
'The Fudge Family in Paris,' a series of poetical epistles,
an entertaining collection of satirical remarks on character
and politics, which was published in 1819. While seeing
'Lalla Rookh' through the press he had removed to Hornsey near London, and here in September 1817 he lost
one of his children. Early in 1818 he learned that his
depth in Bermuda, 'After keeping back from me the proper
receipts of 'Lalla Rookh,' which I have never since seen;
now, it seems, made free with the proceeds of a ship
and cargo deposited in his hands, and I am called upon by a
motion from Doctors' Commons, to be accountable for it.'
The claim was for about 600L of which he hoped to be
recovered from the depth. On this occasion his friends
flocked round him with offers of assistance, but he declined
receiving any, as he preferred paying the money, whatever
it might be, by the earnings of his pen. In 1819 he
accompanied his brother Mr. John Moore to India, taking a
journey to Italy, visiting Rome in company with Chantrey
the sculptor, and Jackson the painter. This expedition was
recorded in 'Rhymes on the Road,' published together with
'Tales of the Holy Alliance,' the same year; they were said
to be 'excellent and entertaining, written in the manner of the
Pococautan Society,' and are serious, political, artis-
tical, and satirical by turns. As the law proceedings
respecting the defalcations were still pending, he did not return
to England; but, settling for his family, took up his abode
at Paris, where he continued until 1825. He purposed
to work hard; but the gaiety of the place, the interruption of
visitors, and probably anxiety as to his ultimate loss, pre-
vented his carrying his intentions into full effect. He
had entered into an engagement to write a life of Sheridan;
but in Paris he found himself, or thought himself, so unfur-
nished with materials, that he gave it up and 'The Loves
of the Angels,' a poem, issued in 1823, and the prose-poetical
romance of 'The Epicurean' (published in 1827), were the
only additions. He returned to London in 1825.
The claim with regard to the Bermuda defalcation had by
this time been settled by Mr. Moore's friends in London,
having been reduced to 74L, which was paid by a cheque
from Lord Lansdowne, and repaid by Moore, clearly from the
proceeds of his 'Loves of the Angels' and his 'Tales of the
Holy Alliance.' He now settled at Sloperton
Cottage, near Bowood, the residence of the Marquis of Lan-
downe; and in 1824 issued the 'Memoirs of Captain Cook.'
Mr. Moore died at one of his visits to London, and his 'opera'
was published in 1825. In 1827 'The Epicurean' was published,
with some fragments of a poem called 'Alciphron,' on the
same materials.
Before this Byron had presented Moore with his
manuscript autobiography, for his especial benefit, but not
to be published till after his death. In this year, in order

3 K 2
MORACEAE, a natural order of Exogenous Plants which were formerly placed as a sub-order of Urticales. The species are shrubs, with a milky juice, sometimes climbing. The leaves are commonly lobed and rough. The flowers are small, mousieous, and collected in heads, spikes, or cattins. The ovules are solitary and suspended. The ovary two lies in the midst of flabby allumen, hooked, with the radicle long, anterior, folded down towards the cotyledons.

Although the Mulberry and Fig grow in Europe, all the Moraceae are extra-European. The species inhabit the temperate and warmer regions, often forming vast forests. The genus Ficus is the most distinguishing feature of this order. [Ficus.] Most of the plant of this genus furnish chincouc. [Cauternouc.] The fruit is always large and globose, and the leaves are the food of the Silk-Worm. [Morus.] Several species of Dorstenia are used in medicine. [Dorstenia.] Other genera of this order yielding useful products are Bruxosoneta and Mascara. [Broussoneta; Mascara, s. 2.]

This order embraces 8 genera and 184 species.

MORCHELLA, a genus of Fungi, one of the species of which is estalble. M. esculenta, the Morel, springs up in orchards, woods, and cinder-walks, early in the spring and summer, and is believed to be most plentiful in places where the ashes are burnt. The Morel is a fruit so considered by many that they cannot persuade of tractable, to draw to woods in order to obtain a crop of morels, of which they are very fond. At last the practice was put down by law. This fruit is a large sponge, firm and subaqueous, with a calyx, or petal-like covering, and a stem, or central staff, from the size of a pigeon’s egg to that of a swan’s hollow, pale-brown, or even gray, and deeply pitted all over its surface, the depressions being separated by raised aca- stomating lines. The plant has a small smell and an agreeable taste, and is employed for various purposes of cooking, both fresh and dried. In the former state it is most com- monly stewed or stuffed with force-meat; in the latter it is employed as an ingredient in sauces. In this country it is of rather rare occurrence.

MOREL. [Morchella, s. 2.]

MORETON BAY. [Australia, s. 2; Wales, New South.]

MORINGACEA, a small natural order of Exogenous Plants, embracing the species of the genus Moringa. They are characterised by the possession of a many-leaved calyx, perigynous petals and stamens, 1-celled anthers, stipitate and consolidated silique fruit, and seeds without albumen. This order is referred by most botanists to a position near Lepospermum; it is however placed by many among the Fuci. They are natives of the East Indies and Arabia.

The root of Moringa pterygosperma has a prunent odour with a warm biting and somewhat aromatic taste. The stem is used as a source of wood, and the leaves of horses, cattle, and Chicot. They are the Ben-Nuts of old writers, from which the Oil of Ben was extracted. It is chiefly used by perfumers as the basis of various scents. It does not readily freeze, and on this account is used by watchmakers. The flowers, leaves, and other parts of this plant are added to curries in India.

MORMONS. [Smith, Joseph, s. 2; Utah, State of, s. 2.]

MORPHOLOGY is that branch of science which treats of the laws which regulate the forms assumed by Plants and Animals. When this term was originally introduced into natural history science, its application was confined to the explanation of the changes which occur in the conversion of the lower into the higher forms and species of plants and animals. It is now however generally recognised as the science of form in the organic kingdoms. Schieden, in his Principles of Scientific Botany, treats of what is usually called the structure of plants, under two heads, that is General and Special Morphology.

The following are his definition and remarks upon this subject:—

"Morphology is the study of the forms of plants, and of their several parts. It is divisible into a general branch, which treats of the whole animal or vegetable body; and into parts, in each of which the various organs in general, and a special branch, which treats of plants according to their principal groups, as well as their individual organs; and this latter branch again is separate into two parallel sections, namely the delineation of external and internal structure, and the peculiar composition of plants and their parts from various tissues."
In my methodological introduction I have endeavoured to show that the external morphology of plants is really the most important element in botany. This view is not, I think, the history of the science will convince any one of the truth of this view; for it is truly wonderful to observe how far it has succeeded, to the almost entire neglect of all other scientific knowledge, in taking possession of the materials by merely examining a plant, whilst we are continually impressed with the importance of the method of considering that the systems which in recent times have taken another path— I allude to the anatomico-physiological—have scarcely affected more than the introduction of extremely trifling changes in the systems. In the instances clearly untenable, and others at the best of very doubtful value; in other words, in most parts, the method of observation has certainly, from the origin of the science, been the basis of all treatises on botany; but those who have thus pursued it have been far from taking a strictly scientific view of the question, and consequently from curing many of its difficulties. This task is two-fold, at once empirical and theoretical. In its first character the study requires us to examine into and characterise the fundamental forms which, as types, or conceptions of generic and specific shapes, constitute the basis of individual forms. In its second character this study has to unfold the natural laws according to which these types are formed, and which control and explain the deviations that occur in individual forms from their prototypes. For the first or empirical part of our researches, we may consider the process of botanical formation, although of a very fragmentary nature; but in the second or theoretical department we have scarcely even an indication to guide us. That the solution of the difficulties must come, we know; and this solution is a scientific one, and here Schwann has certainly shown eminent acuteness in establishing the analogy between the formation of crystals and that of cells; but unfortunately we have not yet brought the law of crystalline formation into the domain of science. Thus far, at the present time we can do no more than specify the problem presented to botany, the solution of which is alone to be expected when the mathematical construction of the formation of crystals lies perfectly constructed. But even this is not enough: we must enter upon all possible construction in a very different way from what has hitherto been done. For this purpose we must consider somewhat more exactly the characteristics of organic form, especially the vegetable, as opposed to the inorganic. The inorganic form, the crystal, is permanent when once formed; it is unchangeable; the individual (the individual existence) is the form itself, and by its solution and change of form a new individual arises. In the plant, on the other hand, the form is not stable or permanent unless the individual is permanent in the individual: between the two hold good only in the simplest cases. The nucleus of a crystal originates in a definite form, and then passes through a series of forms, until it reaches the deduced crystal; whereas it is never finished, and the plant is permanent until the individual is destroyed with the form. Thus certainly it has a very simple history of development, but this continues merely so long as something is still being added to that which is already present, until the whole is completed. The cell is formed in a manner somewhat analogous to this, originating in a definite form, and passing through a series of changes, which, as it appears, only contribute new matter until the form is complete; this then remains stationary until its solution and the consequent destruction of its individuality. It is however wholly different in combined forms, and these it is which, with few exceptions, compose what we term plants. Here a number of cells combine together within definite external limits; but these cells themselves do not enter into the form as dead particles of the mass; they continue to develop new cells, whilst the old ones are partially destroyed: the newly originated cells change, by their arrangement, the form of the whole, and since formation of new parts and destruction of the old are continually going on it is not easy to determine at a given moment, without appearing as anything definitely fixed. As, however, this metamorphosis is constant in its nature, and only occurs in individual parts, we cannot regard each one of the forms resulting from this continual process as a separate and direct result of a modification of the one immediately preceding it; and this peculiar connection brings the whole to us as one individual, which, at its first appearance, may be entirely different in all its parts, both in shape and material, from what it is at last; but in the conception of which we must comprehend the whole series of changing forms, wherein the widely distant members have perhaps no element identical, if we would attain to scientific knowledge, if we would adequately understand the object, and not merely acquire a disjointed, unconnected knowledge, we must go back to the very roots of all these considerations it follows, granting the paramount importance of the morphological method of observation, that we gain nothing by the comprehension of the forms-complex and simple—of the whole plant, but must trace out the law of morphological development, and directly to the conditions which requires, not to an individual complete at any one period, but to the comprehension of the collective constant series of normally changing forms. The conception of genera and species is for the time being not the result of a comparison, but the result of a comparison but also of a connection of the various individual characteristics with each other. In this manner we should lay a firm foundation for the inductions to lead us to the theory of organic morphology, if we could but succeed in completing the analysis of the formation of inorganic forms. As yet we are far from this point, and simply because it is only in the most recent times, and yet very imperfectly, that the importance of the study of the history of development has been acknowledged. But without this, botany would be wholly divested of all scientific principle. This deficiency renders it impossible as yet to treat morphology with scientific logical development, or in accordance with a perfectly systematic mode of arrangement; as will but too soon be seen. For the organic is still but one, although the blame of this is only partially to be imputed to me. It seems however practicable perfectly to state the problem, and to this end I subjoin the following remarks:—We have then to establish morphologic formation, and to delineate the forms themselves. The first must remain for the present a mere problem, the solution of which must be reserved for succeeding times. The second may be accomplished, although imperfectly. I say imperfectly, because, instead of those complete series of derivations, that is to say, series of which we ought alone to treat, we only know a few individual conditions; and therefore the greatest portion of the task still lies unperformed before us. Here we must again be distinguished between what we call the forms, which occur in all or in very many plants of a very different kind, and may therefore especially serve as the foundation of the study of vegetable forms; that is, General Morphology. 2. Series of forms which are only peculiar to definite groups of plants: Special or Comparative Morphology. These two would further branch off into the consideration of form without reference to its composition from the different forms of the external organs: External Morphology; and into the consideration of the manner in which forms are composed according to the principles of nature and society, the normal and inorganic: Comparative Anatomy). This last part falls however away from General Morphology; for all that we can, for the present at least, say is, that every plant is composed of organs, to which the different kinds of organic forms have already been treated. Even with respect to the second part, in regard to Comparative Morphology, it appears to me unadvisable to divide the two sections, on account of our deficiency of material; I shall, therefore, in the examination of the individual groups and parts of plants, subjoin all that is known concerning their structure.
of North America in 1799. His parents were members of the Society of Friends, and he had the misfortune to lose his father early in life. His mother however married a second time when young Morton was thirteen years old, and from his step-father he seems to have derived a liking for the study of natural history. When he was thirteen, he was placed in a counting-house, but his taste for natural science led him to abandon business and enter the medical profession. He was accordingly placed with Dr. Joseph Parrish of Philadelphia, who, although unconnected with any public medical institution, gave him every facility for the management of young men studying the medical profession. He attended the lectures and passed through the course of instruction prescribed for the students of medicine in his native city, and at the age of twenty-one, was admitted a member of the Academy of Sciences (Philadelphia). Soon after this event he sailed for Europe, and, after visiting an uncle—Mr. James Morton of Clonmel, in Ireland,—he repaired to the University of Edinburgh. Here he studied two years, and graduated in medicine in 1823. His inaugural thesis was entitled, 'Tentamen inaugural de Corpore Dolore.' During his period of preparation for graduating in Edinburgh he visited France and Italy, and made a stay in Paris. He returned to Philadelphia in 1824, in time to witness the departure of some of the most eminent literary and scientific men in Philadelphia to join in the illustrious social experiment of Mr. Robert Owen at New Harmony. Morton became immediately an important member of the Academy of Sciences. He commenced his contributions to its transactions by a geological paper. It was entitled, 'Analysis of Tabular Spar from Bucks County.'

He subsequently contributed many papers on Geology and Palæontology; his work on the Mammalia is several of the most important of these papers were published in a separate volume entitled, 'Synopsis of the Organic Remains of the Cretaceous Group of the United States.' This was a very valuable contribution to Geology, and was received with the warmest commendation by the scientific world. He cultivated greatly the natural history sciences, and wrote several papers on zoological subjects.

Whilst pursuing natural history with success, he did not neglect to go to the professional in the Academy. Several previous years, however, were but preparations for the great works on which his reputation as one of the first ethnologists of his day is founded. The line of his research on the races of men lay more particularly in their anatomical conformation, and especially in the structure of the skull. During the winter months, he made collections of skulls and extant, and which is now in the possession of the Philadelphia Academy of Practical Sciences. The origin of this collection may be given in his own words:

"Having had occasion," he says, "in the summer of 1830 to deliver an introductory lecture to a course of anatomy, I chose for my subject 'The Different Forms of the Skull as exhibited in the Five Races of Men.' Strange to say, I could neither buy nor borrow a cranium of each of these races, and I found myself without a single specimen of the Mongolian or the Malay. Forbidding impressed with this deficiency in the most important branch of science, I at once resolved to make a collection myself. The result of this determination was not only his great collection, but the two magnificent works entitled 'Crania Americana,' and 'Craniys Egyptiaca.' These works embrace not only an account and illustrations of these skulls, but general ethnological observations on the races of men. The collection on which these works were founded was made by using the human crania, collected from all parts of the world, 278 crania of mammals, 271 of birds, and 88 of reptiles and fishes.

Although in his earlier writings he maintained the specific unity of the human race, in the latter part of his life he was led to doubt this view. He, however, believed the existence of a variety of species among men. This view has been strongly insisted on, in a work published since his death, under the title of 'Types of Mankind.' This work, edited by Messrs. Nott and Glidson, contains a large mass of matter by the editors and others, with many "Excerpts" from Morton's inedited papers. In these be undoubtedly arows his belief in an "aboriginal plurality of races;" and expresses his conviction, that man will yet be found in the fossil state as low down as the Eocene deposits, and that he walked the earth with the megolonyx and plesoatherium. It is only right to add that these views have not been generally received; and that our most distinguished ethnologists, palæontologists, and geologists have not ascribed his theory to lack of scientific judgment. Dr. Morton died at Clonmel, after a short illness of five days, on the 17th of May, 1851.

MOSANDERITE. [Mineralogy, S. 1.]

The following is an account of the structure of the Male Mosquito, the Mosquito of the Americans, by an American observer.

'The male mosquito differs considerably, as is well known, from the female; his body being smaller and of a darker colour, and his head furnished with antennae and palpi in a state of greater development. Notwithstanding the fitness of his organs for predatory purposes he is timid, seldom entering dwellings or annoying man, but restricts himself to damp and foul places, especially sinks and privies. The female, on the other hand, gives greater extension to her appetites, and her approach to human beings is accompanied by considerable disturbance and vexation during the summer and autumn months.

'The head of the male mosquito, about 0.67 mm. [millimetre] in length, consists of 14 joints, 12 short and nearly equal, and 2 long and equal, terminal ones, the latter measuring together 0.70 mm. Each of the shorter joints has a frassinated skeleton with an external investment, and terminates simply posteriorly, but is encircled anteriorly with about 40 papillae upon which are implanted long and stiff hairs, the proximal sets being about 0.70 mm. and the distal ones 0.70 mm. in length; and it is beset with minute bristles in front of each joint.

'The two last joints have each a whorl of about 30 short hairs near the base.

'The female the joints are nearly equal, number but 13, and are placed at equal intervals round the base. Here, as well as in the male, the parts of the antenna enjoy a limited motion upon each other, except the basal joint, which, being fixed, moves with the capsule upon which it is implanted.

'The space between the inner and outer walls of the capsule, which we term conveniently the auditory capsule, is filled with a fluid of moderate consistency, opalescent, and containing minute spherical corpuscles, and which probably bears the same relation to the nerve as the lymph in the vascular system.

'The genus of the antennae proceeds from the first or cerebral ganglion, advances towards the pedicle of the capsule in company with the large trachea which sends its ramifications throughout the entire apparatus, and terminates immediately posteriorly. Here the nerves divide into two portions. The central nerves continue forwards into the antenna and are lost there; the peripheral ones, on the contrary, radiate outwards in every direction, enter the capsule space, and are lodged for more than half their length in sulci wrought in the inner wall or cup of the capsule.

'The female the disposition of parts is observed to be nearly the same, excepting that the capsule is smaller, and the last distal antennal joint is rudimental.

'The auditory sense differ much in the two sexes, but the palpi, although consisting in both instances of the same number of pieces are very unlike. In the female they
are extremely short, but in the male attain the length of 2½ inches; while the proboscis measures but 2½ mm. They are curved upwards at the extremity.

"If an organ of hearing, similar to that described by Treviranus as belonging to the Blatta orientalis, exist in the head of the Mosquito, the tympanum must be of exquisitely minute size, and the animal's organs of hearing, as far as they can be perceived in any way, other than by the animal's own perception, can have no function. The small size of the organ, therefore, is equally to be regarded in the male and female, as the external auditory meatus is situated in a cavity, the floor of which is bounded by a cornical plate, and the margins of which are studded with very acute hairs; and we are obliged to look for some organ which may answer the requirements of an effective auditory apparatus.

The position of the capillaries, or the disposition of the organs of the function which we assign to them: besides which there present themselves in the same light the anatomical arrangement of the capes, the disposition and lumen of the hairs, the fitness of the expanded whorls for receiving, and of the jointed antennae fixed by the third pair of legs, or by the proboscis, formed by concomitant modifications. The intra-capsular fluid is impressed by the shock, the expanded nerve appreciates the effect of the sound, and the animal may judge of the intensity, or distance, or source of sounds, by the quantity, or proportion, of the flexure, or by the concavity of particular fibers of the stiff hairs, according to their lengths; and of the direction in which the modulations travel, by the manner in which they strike upon the antennae, or may be made to the sense of projection, in consequence of an opposite movement of that part.

"That the male should be endowed with superior acuteness of the sense of hearing appears from the fact, that he must seek the female for sexual union either in the dim twilight or the dark night, when no other means of attracting his attention but the humming noise can serve him as a guide. The necessity for an equal perfection of hearing does not exist in the female; and accordingly we find that the organs of the one attain to a development, or size, which is much more advanced in the male. In these views we believe ourselves to be borne out by direct experiment, in connection with which we may allude to the greater difficulty of catching the male Mosquito.

"In the course of our observations we have arrived at the conviction that the Mosquito is surpassingly capable of receiving the impressions by which the organs of touch in the female; for the palpi are extremely short, while the antennae are very moveable, and nearly equal the proboscis in length. In the male however the length and perfect development of the palpi would lead us to look for the organs of touch in him, for we find the two apical antennal joints to be long, moveable, and comparatively free from hairs; and the relative motion of the remaining joints very much more limited." (Dr. Christopher Johnston, Quarterly Journal of Microscopical Science.)

MOTACILLA, MOTACILLINAE. [BIRD BIRD; BLUE BREAST; SYLVIAAE; WAGTAILAE.]

MOTELLA, a genus of Fishes belonging to the family Gudgeon. It has the following characters: Body elongated, cylindrical, compressed posteriorly, the first dorsal fin very slightly elevated, delicate in structure, scarcely perceptible; second dorsal and anal fins long, continued nearly to the base of the caudal fin. M. vulgaris, Mustela marina (Ray), Gadus tricirratus (Bloch), the Three-Bearded Rocking, Sea-Loche, Whistling Fish, Three-Bearded Cod, Three-Bearded Gade, has the following characters: The length of the head compared to the length of the body alone, without the caudal ray, is as one to two; the depth of the body equal to the length of the head; the first dorsal fin delicate in structure; the first ray elongated, the rest hair-like; the second dorsal fin commencing immediately behind the end of the first, and reaching along the edge of the tail; the first anal fin commencing immediately behind the first ray of the caudal fin; and the second anal fin commencing immediately behind the first ray of the caudal fin, the short of one to four; the depth of the body equal to the length of the head; the first dorsal fin delicate in structure; the first ray elongated, the rest hair-like; the second dorsal fin commencing immediately behind the end of the first, and reaching along the edge of the tail; and the second anal fin commencing immediately behind the first, and the end of the spine portion of the tail; the anal fin commences immediately behind it, is one-fourth less in length than the second dorsal, and ends on the same plane with it; the tail moderate in size, and rounded at the end. The fins in number are—two D. 55; P. 20; V. 7; A. 49; C. 18. The head is depressed; the mouth wide; the jaws nearly equal, but when separated the lower jaw is the longer, with one barbule at the chin; a mixture of large and small rays in each fin; with one barbule on each of the side middle, between the lip and the nostril; of the upper lip crenate; the irides golden yellow; the anterior portion of the body of the fish cylindrical, or slightly depressed; the tail compressed; the general colour of the fish bluish, with a white or yellow-brown spot, on the top of the head, along the back, the pectoral, dorsal, and caudal fins, with rich chestnut-brown; the lower part of the sides, the ventral and anal fins pale yellow-brown approaching to white, and without spots.

Young specimens are of a uniform brown colour, until they have acquired 6 or 7 inches in length; in this condition they are the Mustela alta of Ray. (Yarrell.)

This fish is common on the coasts of Cornwall, and also on the coasts of Ireland.

M. eimbria (Gadus eimbria, Linn.), the Four-Bearded Rocking. This fish has been taken in Scotland, and is common in the Baltic and the southern coast of Sweden.

M. aquascirrus (Gadus mustela, Linn.), the Five-Bearded Rocking. It is common on the southern part of the southern coast. Its habits resemble those of the Three-Bearded Rocking, and by some naturalists it is regarded as a variety of that species.

M. platys (Clialista gurus, Conch.), the Mackarel Midge. This fish has been taken on the coasts of Cornwall by Mr. Conch. It dies instantly on being taken out of the water. It is like the young of some of the other species, but it has not been observed to grow.

M. argenteus (Montagu), the Silvery Gade. This fish is a miniature representative of the Three-Bearded Rocking, as the last is of the five-bearded species. It was first described by Montagu, and is admitted as a distinct species by Yarrell.

MOULMEIN, a town and port in the Tenasserim Provinces, which form a part of the British possessions on the eastern side of the Bay of Bengal. Moultine is situated near the Gulf of Martaban, at the confluence of the rivers Salong, Amsterdam, and Goyang, in 10° 30' N. lat., 97° 44' E. long.; the three rivers when united are called the Moulmein River. It is 10 miles S. by E. from Martaban, and 30 miles N. by E. from Amherst. [Amherst.] Moultine has a good harbor, which admits vessels of 600 or 600 tons. Being situated near the entrance of the Ganges, its trade is free from duties of internal and export, and it has drawn away much of the commerce which belonged to Martaban, and has in a great measure superseded Amherst. The population is estimated at upwards of 10,000. The exports are tea, lumber, rifle, tobacco, ivory, rice, silk, ass, and China stuft. The imports are cotton goods and other manufactures.

MOUNTMELICK. [Queen's County.]

MOUNTRATH. [Queen's County.]

MUSIC ACID. [Oxynkry, S. 1.]

MUCORACEAE, an order in Lindey's alliance Fungalae. The species have a floccose thallus and the sporae surrounded by a vesicular veil or sporangium. They are amongst the smallest forms of Fungi, and attack decaying vegetable and animal materials. They are frequently known by the name of Mouls. [Mouldiness; Fungi; Endoptya, S. 2.]

MUDARIN. [Chymist, S. 1.]

MUDGILL, WILLIAM. [R.L.S. A major-general in the army, the third in succession of the directors of the series of geodetical operations, which resulted in the Triangulational Survey of Great Britain and Ireland, the production of the 'Ordnance Maps' by its means, and the measurement of the English Arc of the Meridian, the history of family and hereditary title, and the occupation of certain offices by a succession of gifted men, have frequently been illustrated in this work. They are again forcibly recalled by the name now commemorated. The Mudgill family, being Chinese, the Mudgill Zee, in the Grammar School at Bideford, in Devonshire, and vicar of Abbotsbath, afterwards a prebendary of Exeter and vicar of St. Andrew's, Plymouth, was the author of an 'Essay for New Version of the Psalms,' and volume of sermons, published in 1727. He died April 3rd, 1760, and was eulogised by Dr. Johnson, whose intimate friend he had been. Thomas Munro, his second son, born at Exeter in
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1716, was apprenticed to the celebrated watchmaker, George Graham, and became himself one of the most eminent mechanists of his time: a select committee of the House of Commons, assisted by a committee of men of science, philosophical instrument makers, and watchmakers, including Atwood, Ramsden, Troughton, and De Luce, declared in 1730, that Mr. Mudge was one of the first watchmakers which this country has produced.

In consequence of a report made by the select committee, a reward of 3000l. was granted by parliament for his improvement of the mathematical sciences. In 1735 the decease took place shortly after, in 1794. A full account of his invention, and of the circumstances in the history of chronometry connected with it, will be found in a work published by his son, Thomas Mudge the Younger, entitled 'The Virtues of the Mathematical Sciences, and the Savings of Time, as practised by Mr. Thomas Mudge,' Sec., Lond., 1790, 4to.

The fourth son of the vicar of St. Andrew's was Dr. Jonas Mudge, F.R.S., for many years an eminent physician at Plymouth, who practised in the inoculated small-pox, and on contagious coughs. But he acquired a higher reputation in practical optics, founded on a paper in the 'Philosophical Transactions,' vol. xlvii., "containing directions for making the best composition for the metals of reflecting telescopes, together with the processes of grinding, polishing, and giving the great speculum the true parabolic form." For this paper, in which an anticipation of Newton was verified, the council of the Royal Society awarded him the Copley Medal for the year 1777, 4th December, 1802, Sir G. Baird, then president, delivered one of his celebrated discourses.

William Mudge, the subject of the present article, son of Dr. John Mudge, was born at Plymouth in 1762, and having received his principal education as a cadet at the Royal Military Academy at Woolwich, was appointed to the Royal Artillery, in which corps he served abroad for some time. After his return to England, the Trigonometrical Survey of England and Wales, which had been commenced by Major-General Warburton, was conducted, by Mr. C. Hutton, under the superintendence of Lieut.-Col. Edward Williams, R.A., Lieut. Mudge, also on Dr. Hutton's recommendation, being appointed his personal associate in the work, and being promoted shortly afterwards to the rank of Captain. This survey, which had suffered some interruption after the decease of the former director, was actively resumed in 1791. In the 'Philosophical Transactions' for 1796 and 1797, are two papers of great length, by Lieut.-Col. Williams, Captain Mudge, and Mr. Isaac Dalby, giving an account of the Survey as carried on from 1791 to 1796. Not long afterwards Captain Mudge succeeded to the office of superintendent, and in 1796 he became a Fellow of the Royal Society. In the 'Philosophical Transactions' for 1800, he continued the account of the Survey during the years 1797, 1798, and 1799; and having attained the rank of Major, R.A., he gave in the volume for 1803, 'An Account of the Measurement of an Arc of the Meridian, extending from the Place of Seeing the Eclipse . . . to Clifton, in Yorkshire . . . in course of the operations carried on for the Trigonometrical Survey of England, in the years 1800, 1801, and 1802.' Major Mudge, who united with energy of character, mathematical talent and culture, and the valuable faculty of readily observing and appreciating the existence of corresponding qualities in others, recognised a kindred spirit in Lieutenant Colby, R.E., conferred an inestimable benefit upon the national work by furnishing his services as his chief personal assistant. In 1802, with Colby's assistance, he measured the base on King's Sedgmoor; in 1806, that on Rhindall Marsh; and during his superintendence a third base was measured by Colby on Behleva Links, near Aberdeen, in 1817. [Costley, Thomas, S. 234.]

In 1798, as a kind of semi-official publication, in 4to, vol. i. of 'An Account of the Survey from the Commencement in 1784, to the end of the Year 1798,' revised from the Philosophical Transactions,' by Captain Mudge and Mr. Dalby. The second part, for the year 1801, was edited by Captain Mudge alone, and continued the account to the end of the year 1799; it was, in fact, a separate issue of the paper communicated to the Royal Society by Mr. Mudge, and noticed by Lieut.-Col. William Mudge, of the Royal Artillery, F.R.S., and Capt. Thomas Colby, of the Royal Engineers, published in 1811, contains the account of the Survey, as carried on from 1800 to 1802. But a very small proportion, however, of the whole body of observations was contained in the volumes, and no further account of the survey was made public until long after the decease of Mudge, when, in 1842, his successor Colby published all the observations made with Ramsey's zenith sector. The maps, however, known as those of Mudge, had already been printed in 1805; and a mile, were first produced under Mudge's superintendence, and were issued from time to time (after an interval during the war, in which they were withheld from publication), until they were finally abandoned, as having the highest value in reference to the topography of the country.

Whilst General Mudge was superintendent, but by the personal exertion of Captain Colby, the principal triangulation of the survey was extended, as just indicated, to the north of Scotland. This was the first step in which it had been carried on under his orders in former years, his successor had to correct errors and supply many omissions. These, as we are informed by competent authority, "had resulted from the hurried manner in which the work was performed, from the very imperfect means placed at General Mudge's disposal, and from the want [since supplied] of a legislative enactment for the preservation of the various trigonometrical observation stations throughout the country, which want sometimes led to a destruction of the observations at different points; so that, all things taken into consideration, it is rather to be wondered at that the work should, generally speaking, be so good as it is known to be." [Mem. Roy. Ast. Soc., vol. xxii., p. 213.]

On 3rd September, 1803, Lieutenant-Colonel Sir Robert appointed lieutenant-governor of the Royal Military Academy at Woolwich; into the administration of which he was stated to have introduced many excellent regulations, which were afterwards extended, and directed, to the Military Seminary for the education of the East India Company at Addiscombe. In addition to the public employments and distinctions which have been mentioned, he was a member of the Board of Longitude, a Fellow of the Society of Antiquaries, a member of the Royal Society, an honorary LL.D. of the University of Edinburgh. The Royal Academy of Sciences of Paris elected him a correspondent, and the Academy of Sciences of Copenhagen, a Fellow. He died at his house in Holles-street, London, on the 17th of April, 1821, in his fifty-eighth year, leaving a widow, with three sons and a daughter.

One of the sons, Richard Zachary Mudge, who entered the army in 1807, and served in the Peninsula, became eventually a lieutenant-colonel in the royal engineers and F.R.S. He also was attached to the Trigonometrical Survey, in which, after Captain Colby had been appointed superintendent, he was entrusted for some years with the local charge of the 'drawing-room' in the Tower of London—where the principal triangulation was kept and the maps actually constructed—during the absence of his chief on other duties. He afterwards retired from the service, and entered into business as a banker in Devonshire. He died at Teignmouth on the 24th of September, 1824, aged sixty-five.

MUDWORT, the common name of the species of the genus Limosella. This genus belongs to the natural order Scrophulariaceae. It has 5 cleft calyx; a 5-5 lobed equal corolla; a globose 4-valved capsule, with a central placenta, free, or connected with a short discintemp below, 1-celled.

L. aquatica is the only British species. It has lanceolate spathulate leaves on long stalks; pedicels axillary, crowded, orange; the flowers small, 4-coloured flowers. It is found growing in mucky places, where water has stagnated.

MULLET. [Mullus; Mullet, S. 8.]

Mullus, a genus of fish, is appropriated to the group Anostomognathi and the family Percidae. The species have the body thick oblong; profile of the head approaching to a vertical size; scales large, deciduous; two dorsal fins widely separated, the rays of the first spiny, those of the second soft. The mouth is large, so as to be practically horizontal, with the labial papillae the lips of the lower jaw; branchiostegal rays 4. There are two species of this genus found in Europe, and both are inhabitants of the seas of Great Britain. M. Austriacus, the Striped Red Mullet, or Striped Mullet, has this form: Length in inches: D. 7—11 $ 13; P. 17; V. 1 + 6; A. 2 + 6; G. 13.

The forehead, nape, cheeks, and operculum are eared
with scales; irides pale-yellow; mucous-pores abundant; the colour of the body is from a pink to a bright-red; the membrane of the first dorsal-fin is tinged with yellow; those of the second is clearer, that of the ventral-fin is furnished with a pointed scale; the vent placed under the commencement of the second dorsal fin.

The Striped Red Mullet is abundant on the southern coast of England, and as far north as the eastern and northern coasts. This fish is good eating, and is sent in large numbers from the London market. In the month of August, 1819, 5000 were taken off Weymouth, and in one week during the month of May, 1831, 10,000 were sent from London to Weymouth. The Striped Red Mullet was a favourite dish amongst the ancient Romans, and large prices were paid for them. "A fish of 3 lbs. weight produced a considerable sum to the fortunate fishermen, while the cost of a fish of 44 lbs., says Martin, was ruinous. A Mullet of 3 lbs. weight was considered a sum equal to 45l.; one still larger 64l.; and even 240l. were given for three of unusual size, procured on the same day, for a repeat of more than usual magnitude." (Yarrell.) On the coasts of Great Britain this fish seldom exceeds 14 inches in length.

The Striped Red Mullet spawns in the spring, and the young are 6 inches long in October. Their food consists of the softer crustaceous and mollaceous creatures. The cirri, with their numerous attached organs of feeling, whereby these animals are enabled to distinguish their food. Mr. Yarrell says, "On dissecting these appendages in the Mullet, the Common Cod, and others, I found the mucous cartilage invested by numerous longitudinal muscular and nervous fibres, and covered by an extension of the common skin. The muscular apparatus is more apparent in the Mullet, the nerve portion most conspicuous in the Cod. These appendages are to them, I have no doubt, delicate organs of touch, by which all the species provided with them are enabled to ascertain, to a certain extent, the qualities of the various substances with which they are brought in contact, and are analogous in function to the feeler, with its different branches and appendages, in certain birds which probe for food beyond their sight; and may be considered another instance, among the beautiful provisions of nature, by which in the case of fishes feeding at great depths, where light is deficient, compensation is made for imperfect vision." ("British Fishes," vol. i, p. 34.)

This and the next species must not be confounded with the Gray Mullet, which belongs to a very different family of Anchothryptygine Fishes. (Hunnu.)

In the Mullet, the Salmunlet, the Red Salmunlet. This fish is much rarer on the British coasts than the last. They seem to be equally abundant in the Mediterranean. The fin-rays are as follows: D. 7—1 + 8; P. 18; V. 6; A. 1 + 5; C. 15. The scales are somewhat shorter than in the last and present some structural differences.

(Yarrell, History of British Fishes.)

MURÉNOIDES (Laopède), a genus of Fishes belonging to the section Anchothryptyrp, and the family of Gobiidé. The species have been included under the genera Blennius of Linnaeus, and Giomellus. They have the head small, mould obtuse; body elongated, smooth; scales minute, covered with a mucous secretion; dorsal fin extending the whole length of the back, the rays simple; ventral fins very small; teeth small, pointed, detached.

M. guttatus, the Spotted Gurnell or Butter-Fish, is distinguished from its congener by the consistence and quantity of its bones, each by which its sides are covered. It is known from the true Blennies by its dorsal fin being but little elevated above the line of the back, and by its elongated, slender, and compressed body, from which circumstance it has obtained the name of Swordick in Orkney and Shetland. In Norway, it is supposed resemblance to the blade of a sword. It is a common fish on the coasts of Great Britain, where it is often found in the little pools left by the tide. It feeds on small Crustacces and the spawn and fry of other fishes. In Greenland it is eaten, but Red Indians are not much fond of it in this country. Its flesh being hard. The length of the head is equal to the depth of the body, and is, when compared with the whole length of the body and head of the fish, without including the tail-fin, as one to eight. It is said to be the length of 10 inches, but its more frequent length on the British shores is from 5 to 7 inches.

Mr. Yarrell states that the Spotted Gannel of America is identical with the British fish.

MUREXAN, MUREXIDE. (Géométr., 2, 1.)

MUSCALES, Aneuranous Plants in Lindley's arrangement of the Vegetable Kingdom. It includes two divisions:—1. Hepaticae; 2. Musci. The Hepaticae include the orders Ricciaeae, Marchantiae, Jungermanniellae, &c. The Musci include the orders Anthocrysea and Bryaceae.

MUSCARDINE, the name given to a disease to which silk-worms are subject, and which often causes great injury to those who cultivate these animals for the sake of their silk. This is the most unfortunate of a fungus belonging to the genus Botrytis, and has been named by Balsamo and Montague B. Basistina. This plant, which is characteristic of the disease, can be propagated by the introduction of spores into a healthy caterpillar. The result of the change which is produced upon the blood and tissues of the animal is its death. This disease is much more common some years than others. It frequently spreads to other insects; and the caterpillars of other Lepidoptera can be inoculated by the spores that are disseminated. When once the disease has appeared there seems to be no means of checking it. The best mode of prevention is to take care that the caterpillars are not over-crowded, and that they have a sufficient supply of fresh food. The predisposition to this disease seems to depend upon the nature of the food; and the same causes as those which act upon the human system, and render it favourable to the attacks of epidemic diseases. (Robin, Hist. des Végétaux Parasites.)

MUSCAT, a port town on the east coast of Arabia, in the province of Oman, situated on a peninsula which is joined to the island of Muscat by a reef of rocks, in 33° 43' N., lat., 58° 40' E. long., and has about 60,000 inhabitants. High lands to the south and west, and the island towards the east shelter the harbour, the entrance to which is from the northward, and protected by forts on each side; within there is room enough for a large fleet to moor in 4 or 5 fathoms water. A fort close to the town, and two other forts on the western side of the harbour command the whole of the port. These forts are made of stone, and are strongly fortified. The houses are only one story high with the exception of some handsome stone buildings erected by the Portuguese. There are also some houses built in the Persian style, and an aqueduct.

Muscat is a great commercial entrepôt, and has a very active trade. A large number of ships belong to it, and trade to British India, Sumatra, the Malay Peninsula, the Red Sea, and eastern coast of Africa, the Comoro Isles, and Madagas- car. Imports from Arabia, Africa, and China, are very considerable. British and French merchants trading at the Persian Gulf stop at Muscat to sell and purchase goods. Besides its principal, there are many subordinate and less active trade with the Arab tribes of the interior. The principal articles of the commerce of Muscat are—assassifruits, almonds, raisins, pistachio nuts, sweetolives, gum sammoniac, sulphur, gum copal, and saltpetre. Other articles are frankincense, pearls, galluuts, coffee, cocoa-nut oil, galba- num, bides, cotton-wool, mother-of-pearl, gun, bees-wax, raw silk, indigo, tortoise-shell, rhinoceros-horns, pepper, cochineal, cinnamon, sugar, rice, sandal-wood, dates, salmon, wheat, horses, salt, dried fish, &c. Most of these articles are imported in Arab vessels from Persia, Zanzibar, Africa, and Western Arabia, and are exported to India, the Mauritius, Bourbon, Calcutta, Bombay, America, France, Zanzibar, &c. The tissens imported at Muscat are British and some long-cloths, British calico-prints, India shawls, Chinese silks, &c. The country near the town is barren; but por- visions, fruits, vegetables, and fresh fish are abundant in the markets. Bulls, sheep, and fowls are to be had at a reasonable price. The average imports into Muscat are probably under-estimated at a million sterling. Imports pay a duty of 5 per cent. if coming from Arabia, America, or Great Britain; 4 per cent, if coming from Bourbon. No Articles are exported on. There is a large town called Muttra, 3 miles to the west, and between Muscat and Muttrah. There is a good road between the two places. At Muttra vessels can be hauled ashore. In the interior there is another large town called Rostaa.

Muscat was a place of considerable trade before the arrival of the Portuguese in the Indian Ocean, and it was then
subject to Ormus. Alberquerque took it in 1607, but had immediately to put down a bloody insurrection of the Arabs. On the eastern shore of Muscat, which was the principal centre of trade in this part of the East, and yielded enormous profits to the Portuguese, who held the town till 1648. During this interval they built the fortifications and greatly improved the town, having erected a handsome church, a college, and many mosques. The indigenous inhabitants, numbering many thousands, are of thin and stunted build, and are very much addicted to the smoking of pipes, and to drinking fruit wine mixed with water and much sugar. They have been reduced to the lowest condition by the Portuguese, who after being gorged with wealth the Portuguese treated the natives so badly and put so many restrictions on their commerce, that they took up arms and drove the foreigners from their country. Many unsuccessful attempts were made by the Portuguese to recover the town.

Left to themselves, the Arabs of Muscat—expert seamen, skilled in the use of fire-arms—soon raised a maritime force which overawed not only the neighbouring coasts, but also the Red Sea. The Indian traders, who had established themselves masters of several places in the Persian Gulf, and were threatening Goemboom; and the British government, acting upon the report of their resident at that place, proposed to send out an armament to clear the Indian seas, and "to root out that nest of pirates the Muscute Arabes." In 1709 the Arabs obtained permission to build ships at the ports of Pegu from the king of that country; and their fleets, comprising ships of from 30 to 50 guns, annoyed trade in the Indian Ocean. As a matter of fact, the Portuguese only had a handful of ships on the road from Canton to Muscat along the Malabar coast. With the Persians they were almost continually at war; although Persian traders were always permitted to trade at Muscat or any of its dependencies, all Persian ships of war were considered fair game. Since the end of the 16th century there have been, and there still are, sailing vessels in the Gulf, which have forsaken their piratical practices, and have confined themselves principally to commerce; and during the rule of the present Imam the territorial dominions, naval power, and commercial importance of Muscat have increased so rapidly, that it entitles him to be numbered among the great powers of the world. He has commercial treaties with Great Britain and the United States, and has opened intercourse with several European and Oriental states.

The Imam of Muscat claims as his possessions in Asia all the south-east coast of Arabia from the frontier of the British settlement of Aden to Ras-el-Had; all the territory of Oman along the east coast of Arabia, the sea-coast and islands in the Persian Gulf, including the Bahrain Islands and the pearl-fishery contiguous to them; and the coast of the Makan. In Africa he claims sovereignty over all the coast from Cape Delgado to Cape Gardafui, including the ports of Monigallow, Lundi, Quilobah, Melinda, Lamoco, Brava, Maga- dino, &c. and he has probably an establishment at Remba, Socotra, &c. Only a small part of this immense territory is garrisoned by his troops; but all, or nearly all, of it is tributary to him. He rules with patriarchal and despotic sway, his manners just and liberal spirit. His government is strict and to Europeans comes near to that of the English. He walks the streets of Muscat at any hour of the night unmolested. Goods are piled up in the streets exposed night and day, and pilfering is never attempted.

The Imam derives his revenue, which is more than adequate to his expenditure, chiefly from commerce, in which he employs a great number of merchant vessels; from import duties on foreign merchandise; and from tribute money or the equivalent presents made him by princes under his sway. His naval force, more efficient than that of all the native empires and princes from the Cape of Good Hope to Japan, numbered in 1857 15 vessels, carrying from 6 to 74 guns; 60 barges (one-masted vessels of 200 to 300 tons), carrying 20 to 300 tons; 500 boats (10 to 100 tons); 5000 to 8000 tons), carrying 4 to 6 guns. The number of vessels belonging to the port of Muscat at the same time, was estimated at 8000 or all sizes, a very large proportion of these being small craft. He has intelligent officers and abundance of sailors; but he keeps only a small number of regular troops, as he can have any number of Bedouins whenever he wants them, merely for the clothing and maintenance. His naval force however is sufficient to enable him to maintain his independence against all the infatuated pretensions over all the territories he claims as his own.

MUSCIDÆ. The House-Fly (Musca domestica) is very common in houses in England. Its favourite position is the window, on the panes of which it may be constantly seen walking. The possession of walking upon smooth upright surfaces has in consequence been a frequent theme of conjecture; and of not a small amount of observation. Dr. Derham, in his 'Physico-Theology' speaking on this subject, says that flies have four legs to hold them upright on the walls and ceilings, and other smooth bodies by means of the pressure of the atmosphere, after the manner as I have seen boys carry heavy stones with only a wet piece of leather clapped on the top as a stone.

This opinion, which has been entertained by the majority of entomologists of the present day, has acquired additional weight by the elaborate investigations of Sir Everard Home, undertaken at the suggestion of Sir Joseph Banks, with the assistance of Mr. Blackwall, and published in the Philosophical Transactions for 1816. The suckers, of which several kinds of flies possess three to each foot, are attached beneath the base of the claws, and are of an oval shape and membranous texture, being composed of two or more membranes, are composed; they had been seen under concave surface covered with down, or hairs. In order to cause the alleged vacuum, these suckers are extended; but when the fly wishes to raise its legs they are brought together, and folded up as it were between the toes. Messrs. Kirby and Spence have likewise adopted this opinion, considering it as "proved most satisfactorily." Other authors of no mean repute have however entertained a different opinion, and have entirely rejected the idea of a vacuum, and of the existence of such objects as suckers as palms, or soles, beset underneath with smallistles, or tenters, like the cone-teeth of a card for working wool, which he conceives gives them a strong hold upon objects having irregular or yielding surfaces; and he imagines that these tenters, or teeth, are perforated, penetrable by the points of these bristles. The same opinion is also given by Shaw in his Nature Displayed; and more recently, Mr. Blackwall has considered that the motions of the foot are to be accounted for by mechanical principles alone; thus, upon inspecting the structure of the parts of the suckers, it was immediately perceived that the functions ascribed to them by Dr. Derham and Sir E. Home is quite incompatible with their organisation. Minute hairs, very closely set, are found downwards, and crisscross the inferior surface of the expanded membranes, imperceptibly denominated suckers, with which the terminal joint of the foot of flies is provided, that it cannot possibly be brought into contact with the object on which those insects move, by any muscular force they are capable of exerting. The production of a vacuum between each membrane and the place of its position is therefore clearly impracticable, unless the numerous hairs on the under side of these organs individually exerted, and the effect produced an aggregate force necessary in order to be anything in their mechanism which in the slightest degree counterbalances such an hypothesis. When highly magnified, their extremities, it is true, are seen to be somewhat enlarged; but when they are viewed in action or in repose, they are an aggregate more at all than that of a vacuum." Moreover, on enclosing a House-Fly in the receiver of an air-pump, it was demonstrated to the entire satisfaction of several intelligent gentlemen present that the fly, while it retains its vital powers unimpaired, can only traverse the upright sides, but even the interior of the digits of an exhausted receiver; and that the cause of its relieving its hold, and ultimately falling from the station it occupied, was a diminution of muscular force, attributable to impeded respiration. Hence Mr. Blackwall is induced to believe that insects are enabled to take hold of any roughness or irregularity of surface, by means of the fine hairs composing the brushes, the most carefully polished glasses not being found competent to prevent the entrance of a drop of air, sufficient to enable a fly to proceed under a powerful effect with a powerful lens. A still different opinion has been maintained by other authors upon this subject, who, setting aside all idea of a vacuum, have conjectured that the suckers, as they have been termed, contain a glistening secretion, capable of adhering to well-cleaned glass; that these glandular substances are then excreted, and that these de la Pluche states that when the fly marches over any polished body, on which neither her claws nor her points can fasten, she sometimes compresses her spine, and causes it to evacuate a fluid, which fixes her in such a manner as to prevent her from moving without diminishing very perceptibly her progress. "But it is much more probable," he adds, "that the sponges correspond with the fleshly bulbs which accompany the claws of dogs and cats, and that they enable the animal to walk upright, without aid of legs, if the animal is to preserve its balance by the adhesion of the sensory of its claws, whose pointed extremities would soon be impaired without this prevention." Notwithstanding the
ridicule which has been thrown upon this opinion in a recent entomological work, it appears, from still more recent investigations, to be not unfounded. Thus, in general, the foot of the fly is described as being composed of two hooks and two flaps, or hollow cups, which act as suckers. Rymer Jones, in his 'General Outlines of the Animal Kingdom,' 1841, says—"The House-Fly is furnished with very minute hairs by his body, they are seen to be covered with innumerable hairs of the most delicate; these flaps, or suckers, as they might be termed, adhere, &c.'

The structure of the foot of the fly has recently been examined in a manner which, he says—'The flap varies in form in different species, from an irregular circle to that of an irregular triangle; and viewing it from one side, it is somewhat thicker at the base (near its attachment), the upper surface being perhaps somewhat convex, but perfectly flat as a whole, when applied to the surface of that form. It appeared to be composed of an upper and under layer of areolar tissue, or something similar to it, between which a bundle of tubes, along with the fasciculus of a large muscle passes; these are placed at its base, and (sometimes protected by a coat of mail,) formed by long scales enveloping each other as a Venetian blind, or in alternate ones, as the scales of a fish, &c., but more frequently wanting) expand in a radiated form, each tube, as it passes along with its fellows, sends off from the base extremities, the best for making observations, (it does not appear to be able to give out this secretion, although it can still attach itself; indeed this fluid is not essential for that purpose: when it is secreted, it is deposited on the glass with great regularity. I have sometimes seen the legs, when applied to a glass, covered with a great number of sucking cups, two or three being larger than the rest, but they form collectively a wonderful instrument of adhesion.'

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MUSCLE, MUSCULAR TISSUE. [Muscles, Organism, S. 1.]

MUSK-BEETLE. [Cerambycidae.]

MUSK-ORCHIS. [Himantodes, S. 2.]

MUSK-OX. [Ox.]

MUSK-ROOT, the root of a plant brought to this country from Russia and Persia, and known also by the name of Sumbul. This root exudes a powerful smell of musk, and has been used in medicine as a substitute for that substance. The plant yielding it is not known, but the root has the appearance of belonging to the natural order Umbelliferae. Its tissues are full of starch.

MYCTEOCHARUS. [Cutleridae.]

MYDROIDES. [Cutleridae.]

MYDROPHORUS. [Convolvulaceae.]

MYOPTERIS. [Chiropteridae.]

MYOSURUS (from μυς, a mouse, and συρ, a tail, the seed being seated on a long receptacle \( \hat{\} \) which looks exactly like the tail of a mouse,) a genus, which, under the natural order Ranunculaceae. It has a calyx of 6 sepals, prolonged into a spire at the base; the petals 6, with a filiform tubular claw; the capsules closely imbricated upon a long filiform receptacle, not bearing; the seeds of the radicle superior. The only species of this genus is \( \text{M. minutus}, \) which has a simple leafless single-flowered stem 2 to 5 inches high. It has a very long receptacle, numerous carpels, and linear leaves. It grows in damp places and in fields. It is a native of Europe and America. The American plant has been described as \( \text{M. Shortii}, \) but there is every reason to believe it is the same as the British and other European plants.

MYOTJTH. [Mammalia.]

MYRIAPODA, an order of Invertebrate Animals belonging to the class Articulata. This order is represented by such species as the Centipede and Gally-Worm. They may be regarded as an intermediate form between the lower and higher classes of the Arthropoda, because they agree with the Annelid forms in the longitudinal extension of their trunk, in the similarity of the segments from one end of the body to the other, and in their cylindrical form. On the other hand, they possess more complete eyes than any of the Verriform tribes, and their radicles, or legs, as parts of their organisation are more nearly allied to Insects. Their covering is firm, and of a horny character.

The division into segments is very distinct, a flexible membrane being interposed between each pair of rings or plates. The legs and other appendages are in the same kind of integument, and their joints are formed in the same manner as those of the body. We find in this class however two distinct types of conformation, of which one approximates most nearly to the Verriform tribes, and the other to that of the higher Articulata; in the former of which the Tulus (Gally-Worm) may be taken as an example. The body is generally cylindrical, or nearly so; the number of segments is considerable, and most of them bear two pairs of thread-like legs on their posterior part, and sometimes amounts to 160 pairs. The legs are very imperfectly developed, being scarcely large or strong enough to sustain the weight of the body, and their articulations being so indistinct that it is impossible to distinguish a pair from their assistance, like a serpent or a worm, than to use them as its proper instruments of locomotion. This kind of movement is facilitated in some species by the incomplete inclosure of the body in the consolidated integument, for this merely forms plates above and below, which are connected at the sides by soft membrane; so that the trunk can be easily placed in any direction. When at rest the body is rolled up in a spiral form; so that the legs, concealed in the concavity of Articulated, are the only visible parts of the body. The animals do not move with rapidity, as they chiefly discomposing organic matter. In the higher division, on the other hand, of which the Scolopendra (Centipede) may be taken as the type, the body is flattened, and each segment is completely inclosed in its horny envelope; the number of segments is not very great, never exceeding 22, and being sometimes as low as 12; and each segment bears a pair of well-developed legs, on which these animals can run with considerable rapidity. Still their bodies are possessed of considerable strength, and are enabled to pass with ease by their way with facility through very narrow and tortuous passages, in search of the insects, &c., which constitute their food. In both orders, the first segment, or head, is furnished with numerous appendages in each side; a pair of jointed antennae; the mouth is adapted for mastication, being furnished with a pair of powerful cutting jaws; and it is also provided, in the Centipede and its allies, with a pair of appendages, formed by a metamorphosis of the legs of the first segment of the body, which are adapted not merely to hold and to tear prey, but to convey poison into the wounds thus made, this poison being ejected through a minute aperture near their points. (Carpenter.)

The alimentary canal is mostly divided into gullet, stomach, and intestine. The stomach usually presents distinct muscular walls. The circulatory organs consist of a dorsal vessel, which propels a current of blood from behind forwards, which is distributed to the body and respiratory organs. In the higher forms respiration is effected by means of trachea, which convey air into the interior of the body as in Insects. The nervous system is arranged in a double series of ganglia, as in most of the Articulated Tribes. They possess cephalic ganglia, which unite above the osphagus, and form a series of rings, which are continued backwards into the eyes and antenna. In many parts of the double series of cords the ganglia of each side unite. The muscular appendages is very complicated, consisting of a series of distinct muscles for each of the appendages. The sexes are separate. The embryo at the period of hatching consists of but few segments, but these increase in number till it is fully grown by the subdivision of the, at first, solid segment. The first number of segments is eight or nine, and they go on increasing in number till they are thirty and seventy. The larva has no legs, these organs making their appearance later.
appearance after the first month. During their growth these
animals have considerable power of regenerating lost por-
tions of their body as the legs and antennae, but this power is
lost when they cease to develop.

Mr. Newport divides the Myriapoda into two orders—
Chilopoda and Chilognatha. [T. W. and C. Castelnau.] The
following synopsis of the genera of these two orders is
drawn up from the list of the specimens of Myriapoda in
the collection of the British Museum (1844):

Order I. Chilopoda.
Family 1. Cermatidae.
1. Cermatius, Illiger. 9 species.

Family 2. Lithobiidae.
1. Lithobius, Leach. 9 species.
2. Henicops, Newport. 1 species.

Family 3. Scolopendridae.
1. Scolopendra, Linnaeus. 38 species.
2. Corystes, Newport. 8 species.
3. Rhombocephalus, Newport. 2 species.
4. Heterostoma, Newport. 7 species.
5. Thyridota, Newport. 1 species.

1. Scolopendra, Gervais. 1 species.
2. Meicropocephalus, Newport. 2 species.
3. Necrophorophilus, Newport. 3 species.
4. Geophilus, Newport. 1 species.
5. Geophilus, Leach. 6 species.

Order II. Chilognatha.
Family 1. Glomeridae.
1. Gliomera, Latreille. 4 species.
2. Zephropus, Gray. 6 species.
3. Spherothorax, Brandt. 2 species.

Family 2. Polychromidae.
1. Polydesmus, Latreille. 1 species.

Family 3. Polydesmidae.
1. Fontaria, Gray. 3 species.
2. Polydesmus, Latreille. 12 species.
3. Strongylosoma, Brandt. 2 species.
4. Ophiomyrmex, Leach. 3 species.
5. Cambola, Gray. 1 species.

1. Platopa, Newport. 5 species.

(Monograph of the Class Myriapoda, Order-Chilopoda, by
George Newbold; Linnaean Transactions, vol. xi.; Car-
penters' Principles of Comparative Physiology.)

MYRISTICUM. [Chemistry, S. 2.]
MYRISTIC ACID. [Chemistry, S. 2.]

MYRICA, a genus of Insects belonging to the order
Hemiptera, and the family Formicidae. It is one of the
genera formed out of the Linnean genus Formica. Unlike
that genus, however, it possesses a sting. The peduncle of
the abdomen is composed of two knots, the antennae are
exposed; the maxillary palpi are long and 6-jointed, and the
trochanters are rudimentary. M. rubra is a common British species.

MYRORHANNIS. This is a name applied to almond-like
kernels of a nut or dried fruit looking like a plum, of which
there are several sorts known in this country. They are the
produce of various species of Myrornissae, as to T. Belonii,
T. Chebula, T. citrina, and T. angustifolia. They vary from
the size of olives to that of gall-nuts, and have a rough,
bitter, and unpleasant taste. Many of the trees of this tribe,
which are all natives of the tropical regions of Asia, Africa,
and America, are esteemed for tanning, and some for dyeing.
They are highly valued by dyers, creating, when mixed with
alum, a durable dark-brown yellow. Myrornissae fetch in
the Bombay market 8r. to 26r. the Surat candy of 831 lbs.
The bark and leaves of T. Calappa yield a black pigment,
which with Indian ink is made; the seeds are eaten like
almonds. A milky juice is said to flow from T. angustifolia,
which, when dried, is fragrant, and, resembling Benzoin, is
used as a kind of incense in the Catholic churches in the
Mediterranean. The fruit of T. Belonii, and of T. Chebula,
both useful timber-trees, indigenous to the East Indies, are
used medicinally as a tonic and astringent. One hundred
and seventeen cwt. of Myrornissae were shipped from
Ceylon in 1842.

The annual imports of Myrornissae into Hull, amount to
about 1600 cwt. The quantity which arrived at Liverpool
was 168 tons in 1849 and 861 tons in 1850; 27,213 bags in
1851, and 19,949 bags in 1852; they came from Calcutta
and Bombay, and are also used for dyeing yellow and black.
The price in January 1853 was 6s. 12d. per cwt. The aver-
age annual imports into the United Kingdom may be
taken at 1200 tons.

Myrornissae is also the English name given by Lindley to
the natural order Convolvulaceae, which yield many fruits.
(Symonds, Commercial Products of the Vegetable Kingdom.)
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protruding their bodies. Some have black spots on their heads, which have been regarded as eyes. To this family belong a large number of little-studied forms of very minute fresh-water worms. The smaller ones are sometimes called Viburmes, of which the very common Viburmes subterraneus of the amateur microscopist is an example. It also appears to embrace the Sylorina of Lamark, the Proto of Oken, and the Crininae of Saviagey.

The soil is composed of Carbon and Hydrogen, frequently found in the neighbourhood of coal-deposits, and in other parts of the earth. It contains 82\% of carbon and 14\% of Hydrogen. It is a limpid or yellowish fluid, lighter than water, and hence called Mineral Oil. Its specific gravity is the same as that of the army. The substance called Petroleum on exposure to air. It may be obtained from Petroleum by heat, which causes it to pass off in vapour.

Naphtha issues in large quantities from the coast of Persia and the Birmian Empire. At Raungon, on one of the branches of the river Iravadd, there are upwards of 500 naphtha and petroleum wells, which afford annually 419,000,000 heads. In the peninsula of Acheron, on the western shore of the Canus, is a well of oil, known as the core of the Cole, and is collected by sinking pits several yards in depth, into which the naphtha flows. There is an abundant spring near Amiana, in the Duchy of Parma. Mr. Dana says that in the United States it was formerly collected for sale by the Syndicate, on the lakes, and on the coast. The naphtha is used by the army as a smoking mixture. It is an excellent medicine, and is found to be a good stimulant in some chronic diseases. It has been externally applied as a lotion in cutaneous affections. It is sometimes substituted for drying oil in making paint. It is also employed for preserving the metals of the alkalis potash, soda, and sodium, which cannot be kept in contact with any substance containing oxygen.

The Raunoon petroleum contains the compound Paraffine. This substance has also been obtained pure in a liquid form from the coal-pits of Derbyshire. It is used for the purpose of diminishing the friction of machinery as a substitute for sperm-oil. It is now obtained artificially from coal, and also in a solid form, from which candles are made.

[Dana, Manual of Mineralogy ; Gregory, Handbook of Organisation.

NAPHTHALEINE. [Chemistry, S. E.]

NAPIER, SIR CHARLES JAMES, G.C.B., was the eldest son of Colonel the Hon. O. Napier, comptroller of accounts in India, by the Lady Sarah Lennox, daughter of Charles, Duke of Richmond, on the Girn, on the 10th of August, 1782. Having received his early education under his father in Ireland, he obtained his first commission as ensign in the 22nd foot before he had completed his twelfth year, and first saw active service during the Irish rebellion of 1798, and again in the insurrection of 1803. In 1805, having obtained his company, he joined the British forces in Spain, and commanded the 55th regiment of foot during the terrible retreat on Corunna under Sir John Moore; he was mortally wounded, and was taken prisoner. Being allowed to go to England on parole, he found his friends actually in mourning for him as dead, and administering his effects; and he employed his period of captivity in writing on colonia, colonisation, and military history, and an essay on the state of Ireland.

In 1809 he again joined the British army in the Peninsula as a volunteer. He had two horses shot under him in the desperate conflicts on the banks of the river Corunna, and the Duke of Wellington had him by chance on the hard-fought battle of Fuentes de Ochoa, in the second siege of Badajoz, as well as in a considerable number of lesser skirmishes. In 1813 we find him serving in a floating expedition on the coast of the United States, and as well as in the North, and many of theGanges N. A. P. 1981 of 1197, and frequent descents upon the coast. He returned to Europe a few days too late to be present at the battle of Waterloo, though he took part in the storming of Cambry, and accompanied the British army to Paris.

Not long after this, while stationed on the Ionian islands, he was appointed governor of Cephalonia. Here his administrative powers were freely developed; and the success of his government is proved by the fact that to the day of his death the Cephalonians called him their "good friend," and paid him an annual tribute of the produce of their vines. While holding this post he joined Lord Byron in a scheme for the deliverance of Greece. He was shortly afterwards superseded—an event which he regarded, whether rightly or wrongly, as an injury inflicted on his merits.

After a short command of the military district of the north of England, in 1838 and 1839, Sir Charles Napier, now a major-general, was ordered in 1841 to take command of a force in the Crimea. This was the culminating point of his career. At Bombay he attracted attention by his energetic plans of military reform, to which he continued to devote himself until the appointment of Lord Ellenborough to the governor-generalship of India. At his suggestion Sir Charles Napier drew out the plan of an Afghan Campaign. Situde at this time was in a very disordered condition, and the British influence and prestige had been much impaired by the disasters in Kabul. The Ameers of Sind were perfectly as they were before, and, as they had by no means, to subdue them by open attack. For the first time they were eminently successful. He blew up the fortress of Eumam Ghur, which was always deemed impregnable. Having accomplished this exploit, which was characterised by the execution of the late Governor-General, he made himself acquainted with the extraordinary and extraordinary forces of all military feats, he pressed on, and with a very inferior force in point of numbers routed the Ameer at Meenane, February 17, 1845. In a few days the army took possession of Hyderabad, and outflanking the Persian force of the side was driven from the field with prodigious slaughter. Having now become master of the fair territory of Sind, Sir Charles Napier set vigorously to work to improve its condition. He re-organised the native society, re-distributed the collectorate of the native land, and set the tenure of land on a more just and judicious footing. While in the midst of carrying out these reforms Lord Ellenborough was recalled by the East India Company, and Sir Charles Napier felt that he had lost his best friend and supporter. His Indian services are thus summed up in the words of his brother Sir William Napier, in his Narrative of the Administration of Scinde:—"Two years only elapsed since he quitted Suckur to make war on the Ameer, and in that time he had made the march to Eumam Ghur in the desert sun, gained two great battles, reduced four large and many small fortresses, captured six sovereign princes, and subdued a great kingdom. He created and put into operation a new method of administration to all its branches, conciliated the affection of the different races which inhabited Scinde, had seized all the points of an intricate foreign policy, commenced a number of military and other well-considered public works, and planned still others connected to the sea, but having also a prospective utility of aim." And all these works he performed in spite of a press of correspondence, long journeys on camel and horseback beneath a tropical sun, and under frequent and severe attacks of illness, at the age of sixty-three, and in spite of every mortification that malice and intrigue could devise against him. Unwilling to leave Sind without some permanent proof of his ascendancy over the popular mind, and the consciousness of having contributed materially to the prosperity and happiness of the people, he contrived to change the feudal system of land-tenure for that of landlord and tenant, considering that such was the best plan of forming loyal subjects by raising a class of farmers and small landholders attached to the government by ties of a personal and pecuniary interest. In 1847 Sir Charles Napier returned home, and met with an enthusiastic reception; but ever ready at the call of duty, he re-engaged for India in March 1849, at the suggestion of Lord Palmerston, and as he had continued to hold a mind to work forthwith to carry out a system of military reform, his immediate object being to school the luxury and extravagance of the British officers into a simple and severe mode of living. In this work he was partially successful.
He returned to England in 1850, but his health and spirits were fast failing, and the last time that he appeared in public was on the occasion of the funeral of his friend and patron, the Duke of Wellington, in November 1862. He died of a gradual decline at Oaklands, his seat, near Portsmouth, on the 29th of August, 1853, like a gallant soldier, under the old colours of the 22nd regiment and other trophies of his European and Indian career, buried in the ground to which he had been attached to the gown chapel at Landport, near Portsmouth. Sir Charles Napier was twice married—in first, to Elizabeth, daughter of John Oakley, Esq., of Deal, Kent, by whom he had two children; and secondly, in 1834, to Frances, daughter of William Philips, Esq., and widow of Captain B. Alcock, B. N. A bronze statue of the conqueror of Sinds has been erected by subscription in Trafalgar-square.

NAPLES.—The continental territories of the kingdom of the Two Sicilies are divided into 15 provinces, the area, subdivisions, and population of which are given in the subjoined table. The provinces beyond the Favo are given under Sicily, & 2.

<table>
<thead>
<tr>
<th>Province</th>
<th>Area in Square Miles</th>
<th>Districts</th>
<th>Communes</th>
<th>Population in 1831</th>
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<td><strong>50</strong></td>
<td><strong>1,840</strong></td>
<td><strong>6,614,989</strong></td>
</tr>
</tbody>
</table>

Population of Sicily at the Census of 1851: 2,091,880

Population of the kingdom of the Two Sicilies: 8,704,742

NARBERTH. [Pembrokeshire.]

NARCISSUS, a genus of Plants belonging to the class Euphorbe and the natural order Amaryllidaceae, among which it is known by its flowers and growing upon a scape, and having a cup at their mouth; the stamens, which are opposite the sepal being longer than the others. It consists of bulbous plants principally inhabiting the warmer parts of Europe.

N. pseudonarcissus, the Daffodil. Scape 2-edged striate; flowers nearly sessile in sheath; crown erect, nearly as long as segments of corolla; stamens equal. It is found in woods and meadows throughout Europe.

N. incompresis has the scape 2-edged. It is found in France and Italy and the coasts of the Mediterranean, and is naturalised in Great Britain.

B. Leaves nearly flat; flowers hypocrateriform.

N. calathina. Scape 2.4-flowered. A native of the Isles of Gleneagles and of Brittany.

N. chrysanthus. Scape 2.6-flowered. Mediterranean and France.


II. Scape 2-edged.


N. poeticus. Scape 1-flowered; petals white. It is found on open heathy fields in Norfolk and Kent, in Great Britain; it is also found in Austria and various parts of Italy.

b. Crown and petals white.

N. p. polyanthus. Scape slightly 2-edged, 8-20-flowered. It is found near Toulon and Nice, in stone places.

N. r. Scapo 6-10-flowered. It is a native of France.

N. unicolor. Scape 10-15-flowered. It is found at the base of Vesuvius.

C. Leaves convoluto-setaceous.

N. soriernus. Scape 1-flowered. It is found near Palermo, on open hills.

N. cantabricus. Scape 1-flowered. It is found in Italy. N. intermedius is probably a variety of this species.


The species, from their hardiness or gay colours, or sweet smell, have long been favourite objects of cultivation, especially the Daffodils, Jonquils, and Tazettas. A very full account of them will be found in the 'Amaryllidaceae' of the Honourable and Reverend William Herbert, p. 398, (Svo, London, 1837), who however divides the genus into six others, after the example of Salisbury and Haworth; but as these genera are not likely to be adopted by botanists, with the exception perhaps of the genus Corbabaria, no account need be given of them. With regard to Corbabaria, to which the name of Hoop-Petticoat Narcissus is given, and of which five supposed species are enumerated, the peculiar form of the flower and the delicate stamens of that plant may perhaps entitle it to be regarded as a peculiar genus; the species are pretty, all yellow flowered, with the single exception of C. cantabrica, a little plant with white flowers found on the mountains of Bisay and the Pyrenees, but now lost in Spain.

NATAL. The British colony on the south-east coast of Africa, is bounded S.W. by the river Umzincula (about 30 miles W. from the Umnzincula, the previous boundary), N.E. by the river Tugala, N.W. by the Drachenberg or Quatthama Mountains, and S.E. by the Indian Ocean. The colony lies between 29° 20' and 32° 50' S. lat., 29° 40' and 31° 25' E. long. The area is about 29,000 square miles. The white population in 1853 was 7029, the native population 112,988.

The Drachenberg or Quatthama Mountains form a broad range which runs nearly parallel with the coast, at a distance varying from 60 to 90 miles from the shore. The average height of the range may be estimated at 8000 or 9000 feet above the sea, and the summits are covered with snow at least 4 months in the year. On the north-west, or interior side, a table-land slopes gradually down almost from the summits of the mountains, exhibiting extensive plains, diversified by a few isolated mountain-groups and low ranges of hills. There is no pass in the whole range between 29° 20' and 31° S. lat. practicable for horses or wheel carriages, and there are very few for pedestrians. Coal occurs not far from the sources of the Tugala, and ironstone is frequently found. Copper has been discovered within 20 miles of Pietramaritzburg. In Natal the country gradually rises from the sea to the foot of the mountains. A few mountain groups occur, which are offsets from the Drachenberg range. The country is diversified with hill and dale.

The rivers are very numerous, and all flow eastward to the sea. Two of the largest are the Tugala and the Umzincula; they both rise in the Drachenberg Mountains. The Tugala receives several tributaries, of which the principal is the Tugala which forms a portion of the country to the north and the Bushman River; and it reaches the sea in 29° 16' S. lat., 31° 25' E. long. It has a bar at the
mound, and is not navigable. The Umzimkulu flows through a rugged and almost inaccessible country, and falls into the sea in 30° 30' S. lat., 29° 20' E. long.

Along the coast, in summer, the average temperature is about 74°F.; in winter about 62°F. Nearer the mountains the climate becomes colder. The rains generally commence in March, and end in September. Thunder-storms are of frequent occurrence, and are very violent. The climate, on the whole, is healthy.

The climate and soil have been found suitable for the cultivation of pumpkins, and it is doubtful if it can be cultivated profitably. Indigo, sugar, and coffee are cultivated, and it is expected that sugar and coffee will become articles of export. Tobacco, cotton, potatoes, pineapples, and pumpkins are raised in abundance. Cattle thrive well; but the climate does not appear to be suitable to the growth of wool. Horses are liable to sickness in the spring months, and many die. The soil is generally more fertile than in the Cape Colony, nor does it appear to suffer so much from droughts.

The elephant, which was formerly common in the colony, is now nearly driven away. The lion and leopard are still met with along the mountain ranges. Hyenas, jackals, wild dogs, ant-bears, and porcupines are numerous. The hippopotamus abounds in several of the rivers, and in the Tugela are numbers of small crocodiles. The larger antelopes are becoming scarce, but there are still many of the smaller ones. The vulture, which is regarded as a memorial of eternity. Several valuable timber-trees grow on the declivities of the mountains and in the mountain valleys.

The colony of Natal is divided into the districts of Pietermaritzburg, D'Urban, Umvoti, Imapana, Tugela, and Umzimkulu, and Natal. The principal town in the colony is Pietermaritzburg, founded by the Dutch boers in 1840, and containing about 3000 inhabitants. It is situated on an offset of the Drakensberg Mountains, in 32° 30' S. lat., 21° E. long., about 50 miles W.N.W. from Port Natal. It contains a barrack, ordnance stores, and Dutch, Episcopal, and Methodist places of worship. It is well supplied with water. D'Urban, the only port of the colony, is situated on the east side of the inlet called Port Natal, which is a bay completely landlocked, and affording good anchorage. The entrance is narrow, and is impeded by a bar, on which there is sometimes not more than two fathoms of water. The cape at the entrance of Port Natal is in 32° 58' S. lat., 21° 3' E. long. Verulam, Winterton, and Williamstown are the largest of the villages.

The white population of the colony is mostly composed of the original Dutch settlers who remained after the dispersion of the boers in 1842, and of the immigrants who have since arrived from Great Britain. The population, consisting mostly of Tulars, is an intelligent and docile people, and make excellent servants. They are scattered in kraals along the banks of the rivers, and round the mission stations along the coast and western boundary. The British colonial court at the capital, Natal, has the same capacities as those of the other courts. It is administered by the High Commissioner, who is regarded as their protector and chief. British, American, and Norwegian missionary societies have mission stations in the colony.

Natal has a lieutenant-governor, who is assisted by an attorney-general and an auditor-general, a collector of customs, a surveyor-general, a crown prosecutor, and a government secretary, who form a legislative and executive council. The revenue in 1854 amounted to 28,454 13s.; the expenditure in 1854 amounted to 28,454 13s.; the balance of the public funds for the year ending 31st August, 1855, amounted to 41,415 1s. A bishopric of Natal was created in 1855, and there are episcopal missionaries at Pietermaritzburg and D'Urban.

The colony of Natal owes its origin to the Dutch boers (farmers), who in the year 1638 emigrated northward beyond the Zooloo river, and became independent of the Cape Colony. They settled themselves in small communities, with their families and cattle, in different parts of the unoccupied territory. These emigrants in 1838 employed their commandant, Pieter Retief, to enter into a treaty with Dingaan, the chief of the Zooloo. Retief was afterwards attacked by Dingaan's followers, and 70 or 80 farmers, and their families and attendants, who visited Dingaan at his place of residence, preparatory to forming their intended establishment in the vicinity of Port Natal. They were received by the Zooloo chief and his warriors with every demonstration of kindness, but were treacherously surrounded and slain in the midst of a professedly friendly festivity. The farmers scattered over the country were next attacked successively, and upwards of 600 men, women, and children were killed, besides those who had been previously massacred at Dingaan's residence. The great body of emigrants, who still remained behind the Drakensberg Mountains, sent off expeditions after expedition to throw open the heights of Natal, and to an attack against Dingaan. The treaty made at Drachenberg, in February 1838, succeeded in putting him to flight. The Dutch farmers then removed to Port Natal, where, in December 1839, they hoisted the tricolor flag, and proclaimed an independent republic, with Andreas Wilhelm Pretorius for president. The British government refused to recognize this independence, and Sir George Napier, then governor of the Cape Colony, sent some troops to take possession of Port Natal. They entrenched themselves, and maintained their position till the arrival of reinforcements by sea, in June 1842, when the Dutch were compelled to submit. By proclamation dated August 21, 1845, the colony of Natal was established by the British government.

NATURALIZATION. A simple and inexpensive method of obtaining naturalization has been provided by the statute 7 & 8 Vict. c. 60, which enables the Home Secretary to give a certificate entitled an alien, on his taking an oath of allegiance and fidelity, to all the capacities and rights of a British subject, except those of sitting in Parliament, or holding office, or being a councillor, or having a majority of the votes in elections. Persons, however, who are considered to be aliens temporary character only as a subject; that is, the alien cannot, on returning to his own country, claim the protection of the British flag, as if he were a natural-born subject. This statute also enables any to hold every species of personal property, except chattels real; and every resident alien may hold lands or houses for residence, trade, business, or manufacture, for a term not exceeding twenty years; this occupation not, however, conferring any right to vote for a representative in Parliament.

The statute enables all persons born abroad of a mother who is a natural-born subject, to take any real or personal estate by devise or bequest, or by gift, or purchase, or succession, and it enforces de facto any alien woman who marries a British subject, in consequence of which, the notorious Mrs. Manning when indicted with her husband for murder, was held not entitled to make a indictment.
him there; but his health was still weak, and when in 1797 his friend Langara became minister of marine he provided Navarrete (now risen to the rank of captain in the navy) with a post in his office at Madrid. His life after this appears to have been as undisturbed by violent changes as a life can be in which one could see the whole set of the war of independence he refused to accept office under the French, and he removed to Seville, but he took no active share in the war. He was re-instanted in office as soon as Ferdinand returned, and for many years continued to be the historian of Spain, the owning power of the Admixture, although the title he bore was that of chief of the Hydrographic department, to which he was appointed in 1823. In the midst of his official duties his zeal for literature and science was not left behind, and he filled volumes, though he never showed them to any but his most intimate friends. As a member of the Spanish Academy, he proposed, about 1815, the new system of orthography which was adopted for its Dictionary, and has been followed by many of the Spanish writers. As secretary of the Academia of San Fernando, which is that of the Fine Arts, he was always at his post, and to their 'Transactions,' and those of the Academy of History, he was a contributor of valuable papers. He was also the author of numerous works, some of which were written from the information they contain. He held his offices and also a distinguished place in the literate society of Madrid through several revolutions; and in 1834, when the Estatal Royal first appeared, he was appointed a member of the French academy, and he was one of the first created. He died at Madrid, on the 8th of October 1844, at the age of seventy-eight.

The great work of Navarrete is the 'Colección de los Viajes y Descubrimientos que hicieron por Mar los Españoles durante los siglos XV, XVI, XVII y XVIII,' ('The collection of voyages and maritime discoveries made by the Spaniards since the close of the 15th century'). The work was to consist of seven quarto volumes: the first and second were published in 1809, the third in 1819, the fourth and fifth in 1837, the sixth and seventh, chiefly consisting of documents relating to Columbus, have not yet appeared in print, but the materials for them were left by Navarrete at his death, arranged for publication and only awaiting the introductions and notes he intended to add to them. The book is described by Humboldt as "one of the most important historical monuments of modern times." Washington Irving, who went to Madrid expressly for the purpose of translating it, afterwards changed his intention, and, in order to save the new matter which it supplied to the 'Lives of Columbus,' in which in fact little belongs to Irving, except the style. This mode of dealing with the materials was perhaps the best that could have been adopted under the circumstances. A French translation of Navarrete's work was commenced never advanced beyond a few volumes. Navarrete was a man who let no day go by without searching into something, who habitually read with a pen in his hand, who had an excellent memory for names and dates, and other small facts, of all kinds, and a talent for combining their results; but he lacked the power of condensation; he was not the man to write a European classic; his prejudice as a Spaniard of the old school influenced not only his writings, but in its absolute theory interhaled with his dignity as an historian. Perhaps he did himself an injury by the learning with which he loaded his volumes. In his 'Colección' the number of new documents brought forward in the first two volumes, is said to have been five hundred, and six hundred in the third, which is certainly not in every large library, and necessary to be consulted by every inquirer into the subject of which it treats, it is little read and is mainly known as a mine for others to dig in. One of the most interesting values of the Hakluyt Society, Mr. Major's letters of Columbus, is for the most part taken from it; but there are few other documents in the collection of such surpassing interest as these.

The other great work with which Navarrete was connected was the collection 'Documentos de la Historia de España,' or 'Collection of Unpublished Documents for the History of Spain,' commenced by him in 1842 in conjunction with Don Miguel Salvá and Don Pedro Sainz de Baranda. The work was published in seven volumes, and, as a matter of interest, the editor of the society which is the most interesting value of the Hakluyt the number of manuscripts which he has added to the collection is one of the most important now publishing in Europe, and is, like Navarrete's previous one, indispensable in every large library. It has been frequently laid under contribution by English and American writers; in particular by Mr. Helps, Mr. Prescott, and others from the United States.

Among Navarrete's other works is the most copious life of Cervantes yet written, originally prefixed to a new edition of 'Don Quixote,' and afterwards separately published in 1818. The work contains a very complete collection of letters. This collection is one of the most important now publishing in Europe, and is, like Navarrete's previous one, indispensable in every large library. It has been frequently laid under contribution by English and American writers; in particular by Mr. Helps, Mr. Prescott, and others from the United States.

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to that of Götingen. After a short stay in Hamburg, in 1811, he transferred himself to the University of Heidelberg, where his remarkable theological attainments obtained him in 1818 the situation of Professor Extraordinary of Theology; and in the same year his reputation occasioned him to be called to a similar office in the University of Berlin. From that time his whole life was devoted to the advancement of Christianity by his writings, which he continued to gain an ever-increasing influence of the world and of the students under his care. The earliest published work which established his reputation was 'The Emperor Julian and his Times,' which at once showed that in the face of the canon of the Church, he was the last to whose writings the General Councils ought to give weight.

It appeared in 1819; in 1825 was issued 'St. Bernard and his Times,' and others followed—on the principal Gnostic systems, on St. Chrysostom and the Eastern Church, on Tartillian and his writings, Memorable Occurrences from the History of Christianity and Christian Life,' between 1818 and 1829. These however were only the preparatory labours for his valuable work, 'Universal History of the Christian Religion and Church,' in 5 vols., issued successively between 1825 and 1845. The history of the Church, 'is, at once a speaking proof of the Divine power of Christianity; a school of Christian experience; a voice sounding through centuries for the edification, the instruction, and the warning of all who are willing to hear.' The development of the Christian Church is seen as the result of the spirit of his next work, 'Geschichte der Pfalzamtung und Leitung der Kirche durch die Apostel,' in 2 vols., published in 1852-33. In these works he has with great ability combated the neologism and rationalism so prevalent in Germany, to which he was ever a decided and uncompromising opponent. He has also combated the spirit of antichrist, which is so prevalent in the history of the Church. His smaller occasional writings were collected by himself, and published in 1859 under the title of 'Kleine Gelegenheitschriften,' for the benefit of the Bible Society of Berlin, of which he was always an earnest supporter. The 'Life of Christ,' 'History of Christianity,' 'History of the Planting of Christianity and of the Apostolic Church,' and other of his works have been translated into English, and form a part of Bohn's 'Ecclesiastical Library.'

The Missouri, as one of the United States of North America, established by Act of Congress 1854, occupies the tract of unclaimed country north of the Nebraska River up to 42° N. lat. It is bounded E. by the state of Iowa, from which it is divided by the Missouri River; N. by the North-West Territory of the United States; W. by the Oregon and Utah Territories; and S. by the Territory of Kansas. The area is 336,886 square miles. The population in 1856 was 10,716. This country and Kansas have hitherto been usually spoken of together (Kansas, S. 9), and the descriptions published have included both. Like Kansas, Nebraska has on the east, extending down to the valley of the Missouri, extensive tracts of prairie lands; on the west a broken and hilly country, rising into the mountainous tract of the Rocky Mountain range; while the centre is occupied by a broad apparently irreclaimable waste, forming the northern part of the Great American Desert, and the home of numerous wandering tribes of Indians. But Nebraska has a larger share than Kansas of this desert land, and in other parts it is believed a fertile soil existed.

The Missouri, as we have said, forms its eastern boundary, and the only actual settlements, so far as we know, yet made in this territory are along the Missouri River, which flows along this river quite up to the Rocky Mountains. The chief affluent of the Nebraska belonging to this Territory are the Loup Fork, Elkhorn, and Wood rivers.

The chief settlement yet formed is Council Bluffs on the Missouri, which is within this Territory, though previous to its organisation assigned to Iowa, under which state it will be found noticed. It is of considerable local importance as the last civilised resting place of the emigrant to the 'far West,' who has reached the Platte River and previous to entering upon what has hitherto been commonly known as the Indian country. Council Bluffs was established as a government Indian agency station. Bellevue, a little lower down the Missouri, is the only other civilised settlement in the Nebraska territory, with the exception of a military station for the surveillance of the Indians. The chief tribes of Indians in Nebraska are the Pawnees, Poncas, Omahas, Ottos, &c.; but we have no account of their numbers or condition.

The Act of Congress which erected Nebraska into a Territory, leaves it open to settlement by citizens of the United States, and to aliens who make the usual declaration of their intention to become citizens; and deors to the inhabitants the right to determine whether slavery shall be permitted to exist within the territory.

NECKAR-KREIS (Circle of the Neckar), a province in the north-west of the kingdom of Württemberg, is bounded N. and W. by the grand-duchy of Baden, E. by the circles of the Rhine and the Swabian, and S. by Baden on the Neckar, and is 57 miles in length from north to south; its breadth is about 36 miles; its area is 1735 square miles; and its population in 1852 was 601,064. The province is traversed by several ranges of mountains, high forest-clad hills, which rise in the western or north-western direction from the Rhine Alb, or Alps of Säbha, in the east of the kingdom. It takes its name from the river Neckar, which, rising on the Baden frontier in the south of the Schwarzwalz, runs in a general northern direction, and is crossed by the river Rhine. Whence it flows northerly past Heilbronn, below which it turns to the north-west, crosses the territory of Baden till it reaches that of Hesse-Darmstadt; from this it forms the boundary to its entrance into the Rhine at Mannheim, after a course of about 170 miles.

Neckar receives in this province the Enz, the Kocher, the Jaxt, and a great number of small streams. It is navigable for small craft from Cannstadt. There are several lakes and mineral springs in the province. The valley of the Neckar, where other rivers is excessively rich and fertile. The chief products are wheat, hemp, wine, silk, and wood. Humped cattle, sheep, and horses of good breed are numerous. Railroads run from Stuttgart to Heilbronn, and from Stuttgart to Cannstadt. The Neckar (from Ulm a line runs east to Angsburg). From the former line a branch is constructed to join the great trunk line along the right bank of the Rhine at the Bruchsal station, between Carlsruhe and Heidelberg.

Neckrophorida, a genus of Coleoptera, insects belonging—

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20 miles wide, formed by the Rio Grande del Norte, traversing it from north to south. The western range of the Rocky Mountains bears various names, as the Sierras de Anahuac, de los Mimbres, de los Orlucas, Mogollon, Madre, &c.; but the name now most commonly given to the greater part of it is the Sierra Madre. Many of the most northern summits of this range are covered with perpetual snow, and may be from 9000 to 13,000 feet above the sea. The southern point of the range is probably the summit of Picacho, which is a very high mountain, and the eastern range, which runs nearly parallel to the other, is known in the northern part as the Sierra Ocehres, and in the southern as the Sierra Sagrado, though the latter name is commonly applied to it throughout. These mountains rise very abruptly at their base, and their sharp, jagged, and crooked knobs variously disposed, with fertile valleys between them. Some of the southern summits of this ridge are also covered with perpetual snow, and the altitude appears to be on the whole somewhat greater than that of the western ridge. Fins generally grow on the higher mountains, oaks and occasionally oaks on the lower ones. The narrow tract bordering the Sierra Sagrado on the east is very elevated, and forms the western boundary of the extensive plain northwest of Texas. The rivers on the west, by which the mountain streams reach the plain, are often heavily timbered, and the soil appears to be fertile; but the intervening spaces have an arid soil, which is only covered with vegetation in the early part of the year.

The valley which lies between these mountain chains forms the district known as New Mexico while the country belonged to the Mexican republic. It is a very elevated tract, the northern part being more than 5000 feet, and the most southern, where it touches the Mexican boundary, 3800 feet more than the plain. Through it as mentioned above flows the Rio Grande del Norte. The surface, especially in the upper part, is greatly broken, and the soil throughout is dry and sandy; but where irrigation is generally very fertile. Rio Grande del Norte, the Rio Pecos, and the Rio Grande del Norte, and there these two crops are often obtained annually. This is the most productive and the only civilised part of the country; a large portion of it being occupied by the farms of the old settlers.

The country west of the Sierra Madre, forming nearly two fifths of the territory, is very much varied in surface. It is drained throughout by the Rio Colorado and its tributaries. The northern part is mountainous, and a large part of the eastern boundary is formed by rugged mountains. The interior is considerably diversified, its direct length from its source to its mouth in the Gulf of Mexico is about 1400 miles, but its course following its windings is full 2000 miles. Throughout New Mexico it is a rapid shallow stream, and has to some extent in its lower course a vast drainage area, and is navigable even by canoes, and though it is well fitted to supply mill-power, it is at present scarcely used except for irrigation. Its lower course is noticed under Mexico. The Rio Pecos is its only tributary of any consequence in this territory; but this stream, though it runs for a considerable distance through a longitudinal valley west of the Río Sagrado, has, owing to the arid nature of the soil, but little water. The Rio Colorado, which drains the western part of the territory, begins in the mountains of the southern part of the Rio Grande till it enters New Mexico, when it bears more to the west, and so continues till it quits the territory and opens into the Gulf of California. The Colorado is believed to be navigable for a great distance, but the country through which it passes is very mountainous and very barren. Several of its tributaries are also believed to be navigable for considerable distances. The most important tributary in New Mexico is the Rio Gila, which drains the great plains mentioned above. It rises in the most southern extremity of the western range of the Rocky Mountains, and after descending into the plain, where it is joined by the San Francisco, an affluent which rises much farther north, it flows through the plain nearly west-south-west to its confluence with the Rio Colorado, about 30° 40' W. lat. Here it appears to be worked on both its banks, but none appear to be of much consequence.

The other more important tributaries of the Colorado in this state are the Nabajos and the Yaquiola.

The mountains are composed of eruptive and metamorphic formations; the rocks enumerated consisting chiefly of granite, silex, haastt, porphyry, &c., but Silurian and Carboniferous strata also seem to have been recognised. New Mexico appears to be rich in minerals, and the silver-mines, gold and copper, which are the most noted. Gold has been found in many places. In the Santa Fe district the peasantery have long been accustomed to employ a good deal of their time in washing the river-sands for gold, and some gold-mines are worked. The Spaniards wrought several silver-mines, but none are now in operation. Copper is said to abound throughout the mountain districts, though only one or two mines are now worked. Iron is also abundant. Coal is said to have been found near the village of Jemez south-west of Santa Fe, and in other places. Gypsum occurs in various parts. On the high lands between the Rio Grande and Rio Pecos and in other places are extensive salt-lakes, or salinas, whence all the salt used in New Mexico is obtained.

The climate differs considerably, but is on the whole temperate; its great characteristic is its dryness. There is a rainy season, from July to October; but the rains are seldom heavy, and never of long continuance. The winters are long, especially in the north; but below Santa Fe the Colorado is rising from snows, and is generally much frozen. In the lower part of the valley of the Colorado the summer temperature occasionally rises to 100° Fahr., but the nights are generally cool. Epidemics are scarcely known. The grain products are confined to maize and wheat; mesquite is raised in the central valley; peas and beans, onions, red pepper, some fruit, and tobacco are also grown. Agriculture is everywhere in a most primitive state. Even in the central valley the chief dependence is on the raising of stock. Large numbers of horses, mules, cattle, sheep are reared, there being everywhere extensive pastures; but comparatively little attention has been yet paid to the improvement of the breeds, which are generally small and inferior.

The almost the only manufactures are those for which the natives have long been celebrated—namely, those of coarse and fancy blankets, in great request for the favourite national garment called the 'serape,' and the checked woolen- stuff called the 'chmere.' Almost all the wood is cut for fuel, and there are no manufactures. Most of the imported articles are received by the Missouri overland route by caravans, by way of Independence to Santa Fe.

Of the 61,695 white inhabitants, about 58,600 are the descendants of the Spanish settlers, and all of them are Roman Catholics. The settlers from the older states and territories of the United States were only 761 in 1860. The natives appear to be an indolent but contented race, taking more of the character of their Indian than their Spanish ancestors. The more laborious work is assigned to the females; not only the household work, and a good deal of the field labour, falls to their lot; but the spinning of the blankets and woolen wares is chiefly done by them. Of the horses, mules, and cattle, the number is very numerous. They are chiefly what are called Ateuc races, similar to those described under American Antiquities, § 1. Several are found along the banks of the Colorado and the Grande rivers and their tributaries. The most celebrated are those known as Las Creole. It requires several years to gain confidence under American Antiquities, § 1, p. 98. Some of equal extent, called La Gran Quiviri, occur near the Salinas, between the Rio Grande and the Pecos, about 100 miles S.E. to the Coloma. But very few of these animals, are said to be portions of an aquaduct 10 miles long.

Divisions, Towns, &c.—New Mexico is divided into seven counties. Santa Fe is the political capital, and though there are several other towns, they have necessarily so small a population that they cannot be very considerable. Among them is Alburquerque, on the left bank of the Rio Grande, 76 miles S. from Santa Fe, which is the only one which requires to be mentioned. It is said to have formerly contained 6000 inhabitants, but it has now little trade or population.
SANTA FE, the capital, is situated about 20 miles E. from the Rio Grande, in a valley formed by N., E., W., and S. ranges of mountains, and at an elevation of 7047 feet above the level of the sea; population, 4846 in 1850. It is an old town, having been founded by the Spanish settlers in 1611, and consists of narrow irregular streets, with houses generally built of adobe. It is situated in a large level plain surrounded by mountains, and it contains two Roman Catholic churches, but no other public buildings of any note. The inhabitants are still nearly all of Spanish and Indian descent, but there are a few Americans, who have established two newspapers and a printing office. His government consists of an assembly of inhabitants, and the relation between these two functions long before the chemical changes by which they are accompanied were understood. In his papers also on the reproduction of limbs in articulate animals, the structure of the ovum in fishes, the development of the ovum in the same class of animals, will be found a series of researches bearing on all the modern progress of physiology.

WHILES it is as an anatomist and physiologist that Newport takes a first position, his minor works and papers claim for him a position of still higher estimation. He was diligent in his observations on the habits of insects, as is proved by his prize essay on the 'Habits and Economy of Athalia centrifolia, the Sawfly of the Turnip.' Besides this paper he published many others on the habits of insects.

In one of these papers he described a species of Parasites, and worked out their history in the most accurate and beautiful manner. This paper was published in the 'Transactions' of the Linnean Society, and was entitled, 'The Anatomy and Development of Calcicididae and 'Transdon,' compared with their special Economy and Instincts; with Descriptions of a new Genus and Species of Bee-Parasites.' As a systematic entomologist, he devoted his attention to the description and classification of the insects, and a series of researches in the British Museum were arranged, and the catalogue descriptive of them published by the authorities of that institution was drawn up by him.

Newport early joined the Entomological Society, and contributed many papers to its 'Transactions.' In 1844 he was elected president of this society, and in 1845 he was re-elected.

During the last few years of his life he devoted great attention to the development of the ova in various kinds of animals. He published two series of papers on the development of the embryo in the ova of the Amphibia, and at the time of his death was engaged in drawing up a third. It was in consequence of pursuing this subject that he met with his death. In the spring of 1845, being desirous of obtaining a complete series of the ovum, he exposed himself to the malaria of the ponds which these creatures inhabit, and on the 6th of April sunk under a fever thus contracted.

Although Newport became a member of the College of Surgeons in 1835, and was made an honorary fellow in 1843, he was too devoted to his scientific pursuits to follow his profession. But England has no positions to offer her men of science, and during the latter years of his life he maintained himself on a pension of £70 a year granted him by the government. Even the luxury of belonging to a scientific society has to be paid for, and out of his small pension Newport maintained his connection with the Royal and Linnean societies, of which he was so distinguished a member. But he was twice rewarded with the royal medal of the Royal Society, and was a member of the council of both the Linnean and Royal Societies. His works were highly appreciated by Continental and other scientific nations, and he was honorary member of several foreign societies. He was an amiable, retiring man, little known beyond the limited sphere of men who cultivate the sciences of comparative anatomy and physiology; but his name will become more widely known when his work is studied; the true value of his researches be more widely appreciated.

NEWSPAPERS. In the 'Penny Cyclopaedia,' vol. xvi., an account was given of newspapers down to 1838. Of the different kinds and numbers of newspapers which circulate in the different countries may have varied somewhat, but their character remains unchanged, except that in France they have been brought still more under government control.

In...
that country they are liable to an official warning for any
infraction of prescribed rules, and after a third warning the
publication is suspended.

In treating of the origin of the newspaper, we stated in
our previous article that the claims of 'The English
Mercuries,' which first appeared in the British Museum,
were forgeries, and that the forgery was perpetrated about
1766. The three numbers, which are marked 50, 51, and 54,
purporting to be part of a series, contain seven articles,
three of which are in print, and four in manuscript.

This series is known as the 'Trojan Horse,' and is
affected, while in the manuscript the spelling is modern,
with a number of corrections in a different hand-writing;
and the manuscript is written on a paper, with the watermark
of the royal arms and initials of "G.R." In 1850 Mr. Watts
made public the result of his further investigations, which
showed that the manuscript was in the hand-writing of
Philip Yorke, the second Earl of Hardwicke, and a few
of the corrections in that of Dr. Birch. Mr. Watts also
proves that the "Illustrated London News," the "Gazette of Paris," in 1831, are also unfounded, and that the
earliest specimen of this branch of literature belongs
"to Italy or to Germany." The claim of Germany is
strongest: at Angoulême and Vienne printed sheets containing
numbers of this "Troyan Horse" are to be seen.

Since the publication of the previous article, the abolition
of the advertisement duty in 1853 (16 & 17 Vict. cap. 33);
the total removal of the stamp duty in 1855, or at least
reduction in cost, for the purpose of paying the penny
postage, which gives the privilege of circulating by post
for fifteen days (16 & 19 Vict. cap. 23); and the introduc-
tion of machinery, by which from 10,000 to 15,000
copies can be produced in an hour; have united in
great numbers to the postal service, the newspapers of
the United Kingdom. In London there are now (April 1859)
published 11 morning newspapers instead of six. The
'Times,' which usually consists of 16 pages, or two sheets,
seems to be an optimal for the purpose of paying the penny
postage, price 4d.; the 'Morning Advertiser,' the 'Daily News,'
the 'Morning Chronicle,' the 'Morning Herald,' the 'Morning
Post,' and the 'Public Ledger,' each of 8 pages, and price 4d.;
the 'Standard' and the 'Daily Telegraph,' each of 8
pages, the 'Morning Star' and the 'Morning News,'
each of 4 pages, the last four published at 1d. each.

As there is now no record of the numbers printed, it is
impossible to give more than approximations; but it is known
that the 'Times' publishes daily from 60,000 to 65,000
copies, and the 'Morning Post,' which is using its own
printers to print 100,000, the general sale nearly approaching
that number. It is clear, indeed, that only a very large sale,
with numerous advertisements, for which the wide cir-
clerange, of the circulation of the occasions of advertisements
in the higher-priced newspapers to maintain themselves, particularly
as some of them, the 'Standard,' for example, do not rely on
the higher-priced morning papers for the more expensive arti-
cles of intelligence, such as the foreign and telegraphic com-
munications, reports in parliament, &c. Of evening papers there
are now eight, the 'Express,' the 'Globe,' the 'Evening
Herald,' the 'Evening Star,' the 'Sun,' the 'Shipping and
Mercantile Gazette,' the 'Shipping Advertiser,' and 'Lloyd's
List" are all weekly newspapers. In London, the 'Globe'
and the 'Public Ledger,' among the morning papers. Of the
others, the 'Globe,' the 'Sun,' the 'Shipping and Mercantile
Gazette,' are papers of 4 pages, price 4d. The 'Express'
and the 'Evening Herald,' are branches of the 'Daily News'
and the 'Morning Post,' and are in the British Museum.
The price 1d., is an evening edition of the 'Morning Star.' The
London Gazette" and the 'Patriot,' the organ of the In-
dependent and Baptist dissenters, are published twice a
week. The 'Evening News,' the 'Evening Journal,' the 'Ex-
change Mall,' the 'St. James's Chronicle,' 'Monet's Times,'
the 'Record," are published three times a week.
Weekly London papers there are altogether 111, but this includes
literary papers, such as the 'Atheneum,' the 'Literary
Gazette,' and 'The Literary Repository,' and many other
publications, such as the 'Solicitor's Journal,' the 'Builder,'
and the 'Pawbroker's Gazette'; but they are all essentially
newspapers, though not all political. One remarkable
feature is the existence of a considerable number of local
papers in London, the 'City Press,' the 'Clerkenwell News,'
the 'Islington Gazette,' the 'Islington Times,' the 'Holborn
Journal,' the 'Marylebone Mercury,' and several others.
These are chiefly papers devoted to local affairs and adver-
tisements, some of them selling a penny in price, and
some being published at a halfpenny. Some other
weekly newspapers are conducted with a large amount of literary
and political talent, and are of a higher price, such as the
'Examiner,' the 'Spectator,' the 'Saturday Review,' the
'London, Gazette,' the 'Leader,' 'The Times,' the 'House-
hold Words,' 'Chamber's Journal,' &c., which, as
not containing news, are not included among newspapers.

Of local newspapers published in England there are 411,
and in Wales 32. Many of these are daily papers,
which are mostly published in the smaller towns; but
Birmingham has two daily papers and Liverpool one
at that price. There are 131 newspapers published in Scot-
land, and the prices vary from a penny, of which price
the extreme is as low as 3d., and £1 being paid for the
London evening papers in Ireland there are 123 published, but only Belfast
and Dublin have any papers so low in price as a penny.

In the Isle of Man and the Channel Islands, there are pub-
lished 13 newspapers, at prices varying from a penny
to three-pence. In the Isle of Wight the price of
the paper named the price independent of the stamp, which in all
cases is charged for extra if a stamped paper is required.
As we have already mentioned it is perfectly impossible even
to attempt to give an estimate of the numbers of papers
which are printed in England, it cannot be done on the
paper which was issued in 1837 seven
one millions passed through the post-office, of which about
three-fourths bore the newspaper stamp, and the other
fouth an affixed postage stamp.

By the Act 18 and 19 Vict. cap. 27, any periodical pub-
lications, published containing thirty-one days of
which the print does not exceed the prescribed sup-
icipies, may claim to be stamped as a newspaper; but in each case
the title must be printed on the top of every page, with the
name of the printer, publisher, and, if printed, must be folded so as to
show the stamp denoting the duty. Newspapers to be sent
abroad by post may be registered at the General Post-office,
for which an annual fee of 4s. is charged, the year always
terminating on the 30th of June. It is not absolutely neces-
sary that the newspaper should be registered, but the English
Post-office then charges 2d. in addition to the foreign or colonial
postage. Before a newspaper can be published a notice must
be given at the Inland Revenue Office, Somerset House, or at
the District Stamp-office, where the form of a "declaration"
must be filled up and handed in. This document, in the in-
tended paper quoted literally; the place where it is to be
printed, giving the number of the house, the name of the
street and of the parish in which it is situated, and the
name and character of the occupation of the printer and publisher, is
like particulars respecting the place of publication if it
differs from the place of printing; the Christian and surnames
of the printers and publishers; the number of shares into
which the property is divided whenever the number, exclu-
sive of the printer and publisher, exceeds two; and the
Christian and surnames, residences, and occupations of every
proprietor, with the number of shares belonging to each
when exceeding two, exclusive of the printer and publisher. This
document, made by the printer and publisher, is signed by
the printers, or by two of the largest shareholders where
the number exceeds two, who must also furnish two respectable
householders as sureties against the publication of seditions,
blasphemous, or personal libels, to the amount of 400l. in
London and 300l. elsewhere. A newspaper adventure
these securities are given; subjects the proprietors to a penalty
of 20l. The paper when published must have across the
bottom of the last page or the last column, the names and
residences of the proprietor and publisher, the place of publi-
cation, the date and edition, the date of registration, and
the period of publication. A supplement must not be issued without the
paper itself; and a copy of the paper, which is paid for, must
be transmitted to the Stamp-office on the day of publication or
within three days, under the like penalty of 20l. for each
offence; but the penalties can only be sued for by the At-
torney-General or the Stamp-office.
The size and amount of stamp-duty for newspapers are defined as follows by the 16 and 17 Vict., cap. 65: Newspaper stamps are to be 1d. only, for a superfluous of print, on one side of the paper, not exceeding 2395 inches, whether published as a supplement or not; any supplement that with the original printed sheet of the newspaper can be exactly reduced to a sheet of one-halfpenny and any other supplement to a duly stamped newspaper not containing a superfluous on one side of more than 1146 inches of print to be subject to a stamp of one-halfpenny; and any two or more newspapers containing from 2396 inches to a duty of one halfpenny each, provided each be published on one sheet of paper only. Newspapers not stamped go by post at the book-post rate of a penny for 4 ounces, twopenny for 6 ounces, and then ascending by twopenny for every 4 ounces, and any number may be sent in one envelope open at the ends.

Newt (Listation punctata). [Salmandrele, p. 336.]

Newtown-Limavady. [Londonerly.]

Newtownards, County Down, Ireland, a market-town, and the seat of a Poor-Law Union, is situated near the head of Lough Strangford, in 54° 36' N, 6° 54' W. long., 124 miles E. from Belfast by the Belfast and County Down railway. The population in 1851 was 5676, besides 605 inmates of the workhouse. Newtownards Poor-Law Union comprises 16 electoral divisions, with an area of 55,841 acres, and a population in 1851 of 50,861. The town, pleasant and healthful in the midst of fields, is neat, regular, and well built. In the Market-square and principal streets are many good houses. The parish church is a handsome building, erected in 1817. There are chapels for Roman Catholics, Presbyterians, and Quakers, and a strong school. The old parish church, erected in 1632, a large building with a handsome spire, is now used as a court-house. There are a market-house, a bridewell, and a Union workhouse. The weaving and embroidery of muslin afford a considerable amount of employment. Quarter and petty sessions are held. Fairs are held on the second Saturday of every month, and on January 23rd, May 14th, and September 23rd. Near the centre of the town is the octagonal structure, with campanile on the top, forming the pedestal of a cross, erected in 1836. Newtownards was incorporated by letters Io, and returned two members to the Irish Parliament.


Nicae. [Canada, 6.]

Nicaea (Nicato), an ancient ruined city in Bithynia, in the north-west of Asia Minor, the site of which is marked by the Turkish village of Is-nik. It stood on the eastern shore of the Lake Ascania, and was built or restored by Antigonus, son of Philip, after whom it was called Antigonea. The foundation was subsequently enriched by Constantine, who married his wife, Nicaea, daughter of Polemaeus, king of Egypt. The city became early the seat of a Christian bishop. It was destroyed by an earthquake in the latter end of a.D. 325, but it was restored and the emperor Alexander II. erected a church. The church was restored by the Greek Nicephorus Melissenus and Theodore I. Solyman, took the city (1080), which was made their headquarters till 1097, when Godred de Bonillon, at the head of the Crusaders, took it after a siege of 36 days, and it was again united to the Greek empire. Two years after the establishment of the Latin empire in Constantinople (1204) Theodore Lascaris made Nicaea the Greek capital, which it continued to be till 1321, when in the reign of Manuel I. Komnenus it was crossed by Nicaea the year before), Constantinople was recovered by the Greeks. In 1333, after an obstinate and bloody siege, the Turks, under Orkan, again took Nicaea, which they made their capital. After the battle of Angora (June 30, 1402) it was taken and pillaged by the followers of Tamerlane. In 1428 it joined in a conspiracy to put Mestapha on the throne of his brother, Amurat II., whereupon the latter reduced the city to obedience, and had his brother and the chief conspirators strangled in the citadel. Sir Charles Fellows, who visited the site of Nicaea, says that the walls form a circuit of four miles. These walls are strengthened with towers. One part is built or repaired with materials of great elegance from an ancient temple; another part is built with brick; a third, and the most remarkable part, is of a later age, marked with the sign of a cross and ill-cut inscriptions, showing the repairs made in Christian times; the remaining parts are built of immense stones cut to fit into each other in the cyclostyled way. Four large majestic gateways with arched entrances still exist in an almost perfect state, but the inscriptions that once covered them have been nearly altogether effaced. Among the existing remains are many inscribed stones, copies of which are given in Sir Charles Fellow's 'Asia Minor;' ancient basilicas; a few edifices, which can be externally distinguished, and other ancient buildings, to prove the existence of an extremely good workmanship, and colossal, the stones being some nine and others fourteen feet in length." Ruins of mosques, baths, and houses are seen among the gardens and corn-fields near the town. In 1499 the town was besieged by the Turks, and changed into a small village of Is-nik, which stands in the centre of the ruins, there is a small church, used by the Greeks for their worship, with Mosaic floor and ceiling of the Byzantine age. Every fence, trough, or paving-stone in the village and its neighborhood is made of marble, and fragments of good sculpture are built into the houses. A Roman aqueduct still conveys water to the town from the neighboring mountains. In the lake, the waters of which are of transparent clearness, are the remains of an ancient landing-place.

In the history of the church Nicema is memorable as the place in which the first and seventh ecumenical or general councils were held. The first, held in 385 (June 19 to August 26), in presence of the emperor Constantine and presided over by Oysa, representative of Pope Sylvester, condemned the doctrines of Arius, maintained the divinity of Christ, and declared the consubstantiality of the Son of God with his Father to be an article of faith. The creed which was drawn up at this council is the Nicene creed, etc., is still true. This council also passed decrees for celebrating the festival of Easter on the same day throughout Christendom.

Nicaragua, Republic of, Central America, occupies the tibby and volcanic region extending from Salinas Bay to the Bay of Conchagua on the Pacific, and back to the rainy- belt. It may be taken generally as lying between 10° 45' and 14° 10' N. lat., 84° and 87° 40' W. long., and as bounded E. by the Mosquito Territory; N. by the republic of Honduras; W. by the Pacific Ocean; and S. by the republic of Costa Rica; but the eastern boundary is really undefined, Nicaragua refusing to acknowledge the right of the King of Mosquito to the tract lying along the Caribbean Sea. The area, consequently, comprises the entire country, which is really under the government of the republic does not probably exceed 35,000 square miles, but that claimed is of course much greater. The population may be about 200,000; the chief part of whom are ladinos, or mulattos, and native Indians.

The coast from Salinas Bay to the Gulf of Conchagua bears nearly north-west. It is throughout rocky, and has some harbours of much value. That which may just now be regarded as the most important, from its being the Pacific port for the Nicaragua route connecting the Atlantic and Pacific Oceans, is San Juan del Sar, north of Salinas Bay, which is formed by two promontories between 400 and 600 feet high, having an entrance above 3000 feet across. The harbour is small, but well sheltered, and in 1863 it was fitted up by the United States Government as a naval station. The site of the capitol is a mile from it is the nearly similar harbour of Nacacelo. Port Realejo, towards the northern end of the state, is also a very good and much larger harbour, and is that which, prior to the opening of the Nicaragua transit route, received most of the foreign vessels trading with the Pacific. There is a very narrow tract of tolerably level land along a good part of the coast.

Along the western side of the republic, at a few miles from the coast, is a ridge of low volcanos, the highest of which is 6150 feet on the southern end, and generally decreasing in altitude as we proceed northward: though one or two of the isolated peaks in the northern part are among the most elevated. It is supposed that the increase of these volcanos appear to stand alone, or to have scarcely anything in common with the rest, the only marked in its general line of direction. The highest summits appear to be Omotpec, which forms an island in Lake Nicaragua (3100 feet above the sea); Monomotomba, at the northern
extremity of Lake Managua, about the same height; Mombacho, between Lake Nicaragua and the Pacific (4500 feet); Nindiri, between Managua and Masaya; Felica; El Viejo, and one or two others. Several of these are active volcanoes.

Another mountain tract, a part of the mountain system of Honduras, extends along the northern part of the country. This part of Nicaragua is traversed by several ridges, some of whose summits attain a considerable altitude. Between the ridges extend many good-sized valleys, the principal being those formed by the larger rivers of the country. The northernmost part of this ridge, which is the most elevated, is the only remaining part of the state that belongs to the plain of Nicaragua, of which, however, the larger portion forms the Mosquito territory. This plain is but little elevated above the level of the sea. It is an arid tract of Nicaragua which occupies a large part of the Nicaraguan plain, and is about 120 miles above the Caribbean Sea. Along the rivers it is wooded; the rest of the plain forms extensive savannahs, covered with a rich verdure, and presenting occasionally a clump of high trees. The climate being excessively hot and moist, the white races have not formed any settlements on this plain, and it is only inhabited by independent aboriginal tribes.

The few rivers which in Nicaragua fall into the Pacific, are of small extent and little consequence. Those falling into the Atlantic are longer and more important. Two considerable streams rise, as already mentioned, in the northern part of the republic, the Segovia and the Escondido; the sources of several others are in the same region. These rivers and their outlets are far apart—that of the Escondido being near the southern, and that of the Segovia towards the northern end of the Mosquito coast. The Segovia flows past the town of the same name, but both rivers belong more to Mosquito than to Nicaragua territory. At the mouth of the Segovia is the town of Moyagalpa, which forms the boundary between Nicaragua and Costa Rica, and falls into the Caribbean Sea, near 11° N. lat. It is by means of this river and the Lake of Nicaragua, that one of the two great lines of communication is proposed to be opened between the Atlantic and Pacific oceans. The river San Juan is the only channel by which the Lake of Nicaragua discharges its waters into the Atlantic. The Lake or Lagoon of Nicaragua is an inland sea, of a brackish nature, about 100 miles long, broad where widest, without narrowing much at either end. It is the reservoir of a great extent of mountainous country, and is deep enough to be navigated by vessels of considerable size, having about 100 yards from the beach generally a depth of about 2 fathoms; and at a greater distance from 5 to 16 fathoms of water along the southern and western banks. It is only very shallow along the north-east shore for a mile or two upwards into the lake. It contains several islands, among which that of Omotepac, near the southern shore, is remarkable for its fertility and population, inhabiting it a numerous and industrious tribe of Indians, who have a small town, Moyagalpa, possessing cattle, and are independent. A quite different scene presents itself about the eastern extremity of the lake; its breadth varies from 100 to 400 yards. About the middle of its course the San Juan receives from the south the Rio San Carlos, and lower down the Serpiqui. About 20 miles from its mouth the river divides into two arms, of which the southern and wider is called Rio Colorado; the other (the San Juan) enters the sea near the harbour of San Juan del Norte. The depth of water in the upper part of the course of the San Juan at low water is about 3 fathoms, and the river is but shallow that rapids are produced, and it contains numerous islands. The lower portion of the river, below its bifurcation, is generally shallow. The mouth of the San Juan has a bar with seldom four feet of water upon it. The winding course of the river is somewhat under 100 miles. On the Pacific side there are, however, greater obstacles to the communication between the two oceans than that presented by the channel of the San Juan. At the narrowed part the distance between the hills that form the channel is about one mile, and the depth of water, except in a few places, is not more than 2 fathoms. On the coast there is here the good harbour of San Juan del Sur, but the hills upon it rise to between 400 and 600 feet, presenting a formidable barrier to the construction of a canal, while the difference of level between the lake and the sea is 130 feet. It is proposed to form a channel across this barrier, which might perhaps be in a measure avoided, but the canal would of course be longer. Whether such a canal ever will be formed it would be hard to predicate; especially since the completion of the railway across the isthmus of Panama has provided so much more rapid a route. But even in the absence of the canal this route has been largely adopted. In 1850 the governments of England and the United States concluded a treaty by which they agreed to co-operate in the establishment of a secure and direct line of communication between the two seas by way of the San Juan River and Lake Nicaragua, to be open on equal terms to all nations, with a free port at each end of the line. A company was formed for constructing a canal, improving the navigation of the San Juan, and establishing a navigation route through the Lake in the latter part of the 1850's. The Nicaragua Transit Company have been unable even to attempt to carry out the first and most arduous part of their task, but they have established steam-boats of light draught to navigate the river, and organised a line of carriages to convey the passengers over the lakes to and from the terminus on the Pacific. During 1854 a very large number of passengers to and from California adopted this route, and it was asserted in some of the advertisements of the line published in New York, that not only was "the Nicaragua Transit route the shortest, safest, and by far the most comfortable and healthful," but that passengers by it had "to travel but 19 miles of land carriage over a good macadamised road." Long before the establishment of this route communication between the two oceans had been attempted by various means. The first attempt was made by the pirates of Margarita, who used the piraguas of from 5 to 10 tons burden. The passage from Managua to the Gulf of Fonseca, is usually made by the piraguas in about 8 days, whilst the distance, measured against the stream, occupies from 12 to 16 days. It has been proposed by some as more advantageous to unite the Lake of Managua by a canal with the harbour of Realejo. The road in its width there is R it is deep, enough for vessels without being rocky. Besides this, the canal would terminate in the port of Realejo, one of the best harbours on the west coast of America, while that near Nicaragua would end in the smaller harbour of San Juan del Sur. But this canal would be more than twice as long as the other; in addition to which, the Tepitapa, which unites the Lake of Nicaragua with that of Managua, must be rendered navigable. The lake of Managua is 35 miles long, and fifteen miles broad, and forms a considerable size; but the Rio Tepitapa, which brings down the water from the Lake of Nicaragua, and is about 25 miles long, has falls which, in the dry season, are from 6 to 8 feet high, and also several shoals. These obstacles could only be avoided by a canal cut through the level ground on the northern side of the Rio Tepitapa.

The climate of the Plain of Nicaragua, as stated above, is hot and moist, and so unhealthy as to have caused it to be left to the aboriginal inhabitants and occupiers of the natives and Indians. The weather is generally settled, the occasional rainy seasons are very short. The thickly wooded banks of the San Juan River are an exception to this observation. The shores of the Pacific, where the population is denser, are also very hot and somewhat humid, but do not appear to be particularly unhealthy, except when the rainy season is in progress, when the town of the Bay of Panama is almost over-run with disease, and there ever there are comparatively few inhabitants. The hilly districts between the coast and the western banks of the lakes are much milder and more salubrious, as is also the mountainous country of the north. There are regular dry and rainy seasons, as in other parts of Central America, the only difference being that the rains last somewhat longer, and fall in larger quantities. In the hilly country west of the lakes occasional showers also occur out of the regular rainy season.

The soil throughout the occupied districts appears to be very fertile, but agriculture is in a rude state; the roads are almost everywhere insufficient, ill made, and ill kept, and even are almost the only animals of draught. Although therefore Nicaragua might with propriety be included in a general list of countries where people furnish vast quantities of agricultural produce for other countries as well as for the supply of a greatly increased population, it really affords little more than suffices for the wants of the whole country, and is not, beyond the Chili of considerable abundance, and form the staple food of the people. Some wheat is grown in the north, chiefly for use in the cities. Sugar, indigo, cotton, coffee, cocoa, and tobacco are all grown, but, except indigo, not to any great extent. There is a great wealth of fruit trees, and except oranges, lemons, &c., ripe well; and garden vegetables flourish, but little attention is paid to them except by the Indians, who cultivate them for sale in the cities. Indigo, Nicaragua, and Brazil wood, and some other timber and dye-
woods and hides are at present the chief articles exported. Cattle are among the principal sources of wealth, very large numbers of them being kept on the plains along the eastern sides of the lakes. Fish are plentiful in the lakes, in which also crocodiles are found. Along the coast pearls used to be obtained. The mineral resources of Nicaragua have not been very diligently explored. Gold and silver have been found and worked, but not extensively; copper has also been found.

The farmers are nearly confined to the coarser goods required for home consumption. The chief articles made are coarse cotton and woollen cloths; the cotton being dyed of a purple colour, obtained from a shell-fish caught in the vicinity of San Juan del Sur, is in great request among the inhabitants. The appearance of any European dyed goods on account of the greater durability of the colour.

Nicaragua is divided into five departments, which are named after their respective capitals—Segovia comprises the north-eastern part of the territory; Leon, the north and north-western; Managua, the district south of Leon; Granada, that south of Managua; and Nicaragua, the most southern part bordering on Costa Rica. Leon is the political capital. The following are the principal towns; the populations are merely local approximations.

Leon, the capital of Nicaragua, contained not many years ago, a population of 32,000 inhabitants, but the civil conversations within the town have reduced it to half that number, and it has become a mere collection of that group of villages situated on the road which leads from the best-cultivated districts of the state to the harbour of Realejo, in 10° 28' N. lat., 86° 02' W. long. The city occupies a considerable area, and contains a cathedral, several churches, a university, Trinity, and a New College. In a very short time after the capture of Granada, on the north-western bank of the Lake of Nicaragua, population about 15,000, carries on some trade with Jamaica by means of the river and harbour of San Juan, contains several churches and convents; but has no features requiring further notice.

Managua, on the south bank of Lake Managua, is a considerable place containing 10,000 inhabitants. Managua, some little distance S. of Managua, has a population nearly equal to it, but almost all Indians, who are engaged in commerce with the adjacent populous country, and in the manufacture of the various articles of domestic requirement in which they display much skill.

Nicaragua, about two miles from the west bank of Lake Nicaragua, contains, with the suburb of San George, some 15,000 inhabitants, and is surrounded by a district noted for its fertility, especially in cacao and grapes.

San Juan del Sur, on the Pacific, S.W. of the town of Nicaragua, is a populous village of some 2000 inhabitants; it was the old selection as the Pacific port for the Nicaragua line of communication between the two oceans. The harbor, as already mentioned, is small but convenient, and possesses good anchorage.

Managua, on the Rio de Segovia, is a small place, whose only claim to notice is that of being the capital of the department of Segovia, the least populous section of the republic. The country around is fertile and healthy, and its mineral wealth is believed to be considerable.

Nicaragua is nominally a Republic with a senate and a chamber of deputies, but the government is really vested in a dictator with the title of Supreme Director. After the declaration of independence, and the formation in 1842 of the republic of Granada, there were few inhabitants of Nicaragua. The British government of the Conch Republic (Granada, S. W.) Nicaragua formed one of the federal states until the dissolution of the union, when, like the other states, it became an independent republic; and, like them, all hopes of its progress have been since arrested by constant internal discord.

The Emperor Paul having been assassinated March 23, 1801, Nicolas was left entirely to the care of his mother, who appointed General Janosfeld his governor, and selected the Countess Lieven and the German philologist Adelung as his principal teachers in languages and literature, and Counselor Storch as his instructor in general politics and other sciences and arts suitable to his rank and station. He acquired the power of speaking the French and German languages with as much facility as the Russian, and early manifest

After the termination of the great European war in 1814, Nicolas was sent to travel, and visited some of the principal battle-fields. In 1816 he came to England, where he met with a cordial reception. He afterwards made a tour in the chief provinces of the Russian empire, and returned to St. Petersburg, 1817, accompanied by his niece Frederica-Louisa-Charlotte-Wellhimbarn, eldest daughter of Frederic William III., king of Prussia, and sister of Frederic William IV., the present king. She was born July 18, 1796, and her distinguishing name was Charlotte, but on her marriage and entering the religious state she assumed the names of Alexandra Fedorovna.

The Emperor Alexander I. having no issue, his next brother Constantine was the legitimate heir to the throne; but, by a document signed August 30, 1823, Constantine renounced his claim to the imperial dignity, and nominated himself the autocrat of Poland; so that, when Alexander died at Taganrog, December 1, 1826, Nicolas immediately succeeded him. He did not however become emperor without a struggle attended with much difficulty. The government had organized a considerable force before the death of Alexander among the officers of the Russian army and those of the nobility who were friendly to a constitutional government; and the soldiers and people were taught to believe that the new emperor was a mere tool of the reactionary party, and desirous of being restored to their former condition by forcible means. When the troops were assembled in the great square fronting the Imperial Winter Palace of St. Petersburg, in order to make a manifestation of their allegiance to the new emperor, the officers, just as the ceremony was about to commence, stepped forward out of the ranks, denounced Nicolas as a usurper, and proclaimed Constantine as their rightful saviour. The soldiers followed their officers, with cries of "Constantine and the Constitution!" Milliards, who was then minister of state, and president of the council, the main body of the army, and the archbishop, in his ecclesiastical robes, endeavored to suppress the hostile demonstration, but in vain, and the people showed signs of sympathizing with the troops. At this critical moment Nicolas came forward, and, boldly confronting the officers and soldiers, called out with a loud voice, "Return to your ranks—obey—kneel!"—The czar's majestic form and undaunted bearing, his pale but calm and stern composure, and the reverence with which the Russians received him, gave to the scene an air of dignity and grandeur, and the soldiers to kneel ground their arms. The first outbreak was thus checked, but the conspiracy was not suppressed till artillery and musketry had torn asunder their missiles of destruction among the gathering masses of the infuriate and excited people, and forty officers and five hundred soldiers were executed. Others were sent to the mines of Siberia, where Nicolas continued their punishments with unappeasable severity. He was crowned at Moscow with great pomp and ceremony, September 3, 1828; and at Warsaw, May 24, 1829.

Soon after his coronation, in 1826, the Emperor Nicolas commenced a war with the Shah of Persia, which lasted till the victory over the Persians by Field-Marshal Paskevich, October 14, 1828. Along the coast from the banks of the Darda and the Danube to the mouth of the Volga, as well as to the fortress of Braila and Varna. In the campaign of 1829, General Diehich took the fortress of Silistra, defeated the main army of the Turks at Shumla, crossed the Balkan, and occupied Adrianople, which he left to one of his colleagues. The campaign was exchanged for September 14, 1829. By this treaty, Nicolas obtained for Russia, besides a large sum as indemnification for the expenses of the war, liberty to trade in all parts of the Turkish empire, trading navigation on the Danube, free passage of the Dardanelles and Bosphorus, and other additions of territory as well as of political power.

On the 29th of November 1830 an insurrection broke out in Poland. The Polish troops having joined the insurrec-
The Emperor Nicolas was upwards of six feet in height, muscular and well-proportioned, with handsome features. In his personal habits he was simple, abstemious, and indefatigably industrious. He had a taste for the fine arts, and collected a magnificent library, but his favourite pursuits were connected with the military sciences and military operations. In his political principles he was professedly despot. He has been heard to say, "I despise the despotic Russian government; that suits the genius of my land." The object of his public life were the increase of the power of Russia and the extension of her territories to the east, west, and south, by unscrupulous diplomacy, and, when that failed, by war. His grand purpose is now known to have been the possession of Constantinople. By means of that unrivalled military and political position, he trusted to have superseded the Sultan in his empire, and to have become the dominant power in Eastern Asia.

NICOLAS, Sir Nicholas Harris, was born on March 10, 1799, the fourth son of John Harris of Cornwall. He entered the navy early, and attained the rank of Rear-Admiral on September 18, 1816, after having distinguished himself in the operations of the Porte against Calabria. As he ceased to be employed after the close of the war he turned his attention to antiquarian literature, and his first production was 'The Life of William Davison; Secretary of State and Privy Councillor to Queen Elizabeth, 1550-1570, published by himself from the 1st to the 9th of June. In 1849 he sent a Russian army into Hungary in aid of the Austrians, and the subjugation of that country was accomplished in the month of August of that year.

The last and most important event in the reign of the Emperor Nicolas was the recent war with Turkey and the Western Powers. It was the only unsuccessful and disastrous war in which he had engaged, and the reverse his army experienced probably occasioned a degree of excitement in the French public as well as Russia. It commenced by the emperor's minister Benckoff in March 1853 demanding a right of protectorate over those subjects of the sultan who belong to the Greek Church. The claim was refused, and a Russian army occupied Moldavia and Wallachia. The Turkish fleet, which was destroyed at the same time the Porte declared war against Russia, and applied to France and England for their promised aid. A Turkish army under Omar Pasha occupied Shumla and the fortresses on the Danube; in November he threw a body of troops across the river opposite Wilin, and fortified a position at Olteniitz, on the left bank, which was retained till the termination of the war. The destruction of the Turkish fleet at Sinope in the same month was followed by the advance of the Allied forces across the Bosphorus. The English and French armies were next landed and encamped near Constantiopolis, whence they removed to the vicinity of Varna. In March 1854 the Russian army crossed the Danube, and besieged the fortress of Silistra, but after great efforts and an enormous loss of men was compelled to raise the siege on the 15th of June, and to retreat across the Danube. The Anglo-French army landed in the Crimea, September 14, 1854; won the battle of the Alma; by a flank movement captured Balaklava, November 29, 1854; and commenced the siege, which, after a severe struggle, the facts of which are well known, was terminated on the 9th and 9th of September 1855, by the capture of the town and all the forts on the southern side of the harbour of Sebastopol.

Meantime, before this great feat had been accomplished, the Emperor Nicolas died at St. Petersburg on the 2nd of March, 1855, and was succeeded by the present emperor Alexander II. The Empress Alexandra survives him, and so has left issue four sons and two daughters: Alexander, born April 29, 1818; Maria, born August 18, 1819; Olga, born September 11, 1822; Countess, born September 21, 1827; Nicolas, born August 5, 1831; and Michael, born October 26, 1834.
lived to complete two volumes. Among his numerous other works were several on the statutes of various orders of knighthood, for which in 1831 he was made a knight of the Hanoverian Guelph Order, and in 1832 chancellor of the Ionian Order of St. Michael and St. George. After a life of industrious industry, he spent nearly every one of which has great historical or professional merit, he died at Cape Coré, near Boulogne, on August 3, 1848.

NICOPOL, NIKOPOL, in Turkish Tekhagani-Kul, the ancient Nibopolis ad Istrum, a city in Bulgaria, in Europe. Nibopolis is either a name or a place, but the Romans, basing their actions on the right hand of the Danube, 80 miles S.W. from Bukharest, 250 miles N.W. from Constantinople, and has about 10,000 inhabitants. The Osma on the Bulgarian side, and the Alata on the Walachian join, the Danube just above the town, but the ancient city, which was surrounded by a trench and palisades. The Christian quarter, which is the largest part of the town, lies beyond the hazzar, and is open to the plain. Nissa is now the chief town of the palaele of Sophia; it is called Nisch by the Turks. It is the residence of the bishop of the Chalcedon archbishop. It is situated at the key to military communications between Thrace, Bulgaria, and Servia, the fortifications of the town are mounted with a considerable number of guns of large calibre, and in good order. The place of Nisa belongs with his city, within the church and the little Balkan, two ramifications of the Hammus, is one of the most beautiful, fertile, and well-tilled districts in Bulgaria. The town was taken by the Turks under the Sultan Amurath I. in 1388, on the march to the battle of Kosovo. A couple of miles above Nissa on the road to Sophia, the site of an action between the Turks and Serbs in the same year is marked by a tower of skulls, which is more terrible in name than in reality. It was constructed of stone and lime, but externally heads were imbedded in the mortar. The Turks were said to have known it to be having in the course of time removed almost all of them for the purpose of interment, but their places are marked by rows of round holes. The tower is 10 feet square, 16 feet high, covered with broken tiles and windows, and is filled with wind in it. The interior is said to be a favourite retreat of snakes and lizards. The Anastatians took Nissa in 1737.

NOTICULUS, a genus of Animals usually referred to the class Aschelus, Asceliina. One species only of this genus has been found in S.W. Europe, and occurs in prodigious numbers along the coasts of England, and is the most frequent case in this part of the world of the phosphorescence of the ocean. It was first discovered by M. Siviray in 1810.

According to M. Siviray the Noticulus is a spherical gelatinous mass, provided with a long filiform tentacle or appendage, presenting a mouth, an osphagus, one or many stomachs and ramified ovaries, and thus possessing a certain complexity of organisation. De Blainville confirmed Siviray's account, and placed Noticulus, without doubt. The most erroneously, among the Diphyidae. On the other hand, Van Beneden Verhaeghe and Doyère, denying the relation of Noticulus with the Aschelus, and regarding its organisation to be of a much more elementary character, relegated it to the Rhizopoda.

To this doctrine M. de Quatrefages also attaches the weight of his authority in his valuable essay 'Observations sur les Rhizopodes' which appeared in the Revue de la Nature for 1850. M. de Quatrefages does not admit the existence of any true mouth or intestinal canal, and considers that the so-called stomachs are nothing but ' vacuoles' similar to those observed in the Rhizopoda and Infusoria.

Krohn.) Which stalk of the pebble might be, a filiform tentacle, equal in length to about the diameter of the body, depends from it, and exhibits slow and motions when the creature is in full activity. I have even seen a Noticulus appear to push repeatedly the tail in the direction of its tentacle.

The body is composed of a structureless and somewhat dense external membrane, which is continued on to the tentacle. Beneath this is a layer of granules, or rather a continuous sheet of granules, which are scattered without any very definite arrangement. From hence arises a network of very delicate fibrils, whose meshes are not more than 1-3000th of an inch in diameter, and these gradually pass internally—the reticulation becoming denser and denser. Thence the granules, in a convergent direction towards the stomach and nucleus. All these fibrils and fibrils are covered with minute granules, which are usually larger towards the centre.
After describing minutely the structure of this creature, Mr. Huxley concludes—

"...on the day I have observed lead me to believe that *Noctiluca* has a definite alimentary cavity, but I am inclined to think that this cavity has an excretory aperture distinct from the mouth. The funnel-shaped depression in the post-oral area in fact always appeared, when I could obtain a view, in the same position as a special process of the stomach. On one occasion I observed the sides of this process to be surrounded by fusiform transversely striated fibres or folds; I could not determine which."

Krohn states that he repeatedly saw the egglayer "in* in the collection of the body*" but he could not determine at what exact point, and he inclines to think it must have taken place through the mouth.

I am equally unable to bring forward direct evidence on this point, but in the existence of a distinct anus is founded simply on the structural details of the body.

"In front of and above the gastric cavity is the nucleus, described by Verhaeghe and Krohn. This is a strongly refracting oval body of about 1-400th of an inch in length, which, by the action of acetic acid, assumes the appearance of a hollow vesicle. The anterior radiating fibres pass from it; the posterior from the alimentary canal."

"Quatrefoils and Krohn consider that a process of fusiform multiplication takes place in *Noctiluca*; both of these processes are observed and noticed with rapture. According to the latter writer, division of the body is preceded by that of the nucleus. I have not had the good fortune to meet with any of these forms, and the only indication of the former is suggested by long blackish bodies which consisted of a number of granular vesicular bodies, of about 1-900th of an inch in diameter, scattered over the surface of the anterior and inferior part of the body."

Such as what repeated examinations lead me to believe is the structure of the body; but if the preceding account be correct, it is obvious that the animal is no Khizoped, but only from the lower ranks of the Protocorallia to the highest.

The absence of a dental armature, and of a distinct anal aperture, are structural peculiarities which greatly increase the affinity to such forms as *Colpoda* and *Para-

"*Noctiluca* might be regarded as a gigantic Infusorium with the grooved body of *Colpoda*, the long process of *Trachelus*, and the dental armature of *Nassula* united in one animal."

"On the other hand, the general absence of cilia over the body, and the wide differences in detail, would require the constitution of at least a distinct family for this singular creature."

In the same volume of the *Microscopical Journal* is an account of this creature by Dr. Woodham Webb, of Lowestoft.

**NOCTUA**, a genus of Insects belonging to the Nocturnal Lepidoptera, is described and figured by Kolen. It is a very pretty species.

**NOLANACEAE.** A natural order of Plants, having elongated or prostrate stems; alternate leaves without stipules. Flowers usually showy; calyx 5-parted, valvate in asivation; corolla monocarpous, with a pistil asivation usually thickened in the tube; stamens 5, equal, inserted into the tube, alternate with the segments of the corolla; anthers oblong, 2-celled, bursting longitudinally; pistil composed of several carpels, either distinct with a single style, or partially combined into several sets, with a single style seated on a smooth disc; stigma somewhat capitate. Fruit inclosed in the permanent calyx, constructed like the pistil; pericarp woody, often a little succulent; seeds ascending, solitary; embryo curved with either straight or double cotyledons in the midst of a small quantity of albumen; radicle next the hilum. This little order is remarkable for the various modes in which its carpels are disposed without ever being consolidated. In one genus there are 8, and they are distinct; in another there are 50 combined in fours, in a third the combination is irregular, but the view, to be obtained in many, is that none of these are all wholly distinct. The species are all South American, and chiefly from Chili. Their uses are unknown. There are 7 genera and 30 species.

The act establishing the County Courts, 9 & 10 Vict. c. 95, has established one exception to the general rule that a plaintiff cannot be nonsuited against his will, by expressly authorising the judge to enter a judgment of non sui, an enactment for which some of the commentators on the Act have attempted to assign any reason.

The practice of giving judgment in the Supreme Courts, as in case of a nonsuit, has ceased since the passing of the Common Law Procedure Act, 1852, which provided a simple and more rational method of putting an end to the action. (See 24 & 25 Vict. c. 344.)

It may be added here that the Crown, being theoretically present in all our courts of justice, cannot be nonsuited; but the Attorney-General, or his representative, may always enter a nonsuit if the defendant himself, in his own person, moves for that purpose.

**NORTH AUSTRALIA.** At present the designation applied to all that part of Australia, comprising considerably more than one-half of the island, which lies north of the parallel of 29° S. lat. This parallel forms the northern boundary of what is commonly known as the South Australian Colonies, all of that of Western Australia remaining unsettled. Coburg Peninsula projects west-north-west from the mainland, between Mount Norris Bay on the north-east and Van Diemen's Gulf on the south-east. This is the section of the coast in that direction nearly 60 miles. The greatest breadth of the peninsula is in the narrowest part, where it is joined to the mainland by a neck of land of 5 miles in length, is 24 miles. On the north side of Coburg Peninsula is the deep inlet named Port Essington, which lies between 11° 6' and 13° 6' and 13° 18' E. long. The inlet, at its entrance, between Point Smith on the east and Vashon Head on the west, is 7 miles wide, and extends south by east about 18 miles; its average breadth is 6 miles. The depth of water varies between 5 and 12 fathoms, and in some places reaches 22 fathoms within the port. There are 5 principal harbours, each of which extends inwards 3 miles, with a width of about two miles; the depth of water is 5 fathoms, with a bottom of stiff mud and sand. These harbours are defended by detached reef and solid breakwaters, and secure anchorage. The port forms one of the finest natural harbours in the world; it may be entered with safety both by night and day. Being within the range of the regular monsoon, it is accessible to the Malay and Bugis trading proas, and to the ships of the Anglo-Indian Revenue and the Red Ensign.

The solt of the peninsula is in general indifferant, but in many places it is good, principally on the low flats and hollows, and near tracts which are swampy in wet weather. There are few vegetables, so that the country is almost barren during the dry season. The north-west monsoon, which begins in October, begins about November. The rain during this monsoon falls in torrents, but seldom continues above two or three hours at a time. The general range of the thermometer at this season is from 69° to 90° F. in the shade. The termination of the monsoon is indicated by squalls, and usually a tempest in the early part of April. In May the thermometer ranges between 75° and 80°, the midday heat being 88°. The average heat of the whole year is 85°, or about that of the coast of China.

With the expectation that, if there were an establishment on the north coast of Australia, it would be resorted to by the traders of the eastern portion of the Indian Archipelago, and the coast of the south-west of India and the South American, and Indian commodities, a settlement was made in 1834 for a settlement at Aspley Strait, and called Fort Dundas, and another in 1837 on the Coburg Peninsula, and called Fort Wellington, but both settlements were abandoned in 1828. In 1838 another attempt was made, and the town of Victoria was founded on the western shores of Port Essington. In 1846 the population was stated to be about 60. The Malays did not settle there, as was expected: the climate is unsuitable to Europeans, and the settlement has been abandoned.

The coasts, islands, and lakes of North Australia have been surveyed and named, but of the interior hardly anything is yet known. Melville Island, on the northerm coast, between 11° and 18° S. lat., 130° 20' and 131° 34' E. long., is one of the largest of the islands. The area is 2,303 square miles. It is separated from Bathurst Island, which lies west of it, by Aspley Strait, which is from 2 to 4 miles wide and 46 miles long. From Coburg Peninsula it is separated by Dundas Strait, which is 15 miles wide. The natives lead a wandering life, and are occupied in fishing, gathering and other marrobial animals, and during the wet season on fish, turtles, crabs, and other shell-fish. Their vegetables are the cabbage-palm and the sago-palm. (See South-East Australia.)

**NORTH-WEST PASSAGE.** In the article North-West Passage an account is given of the series of voyages undertaken for the discovery of a passage westwards from the Atlantic Ocean to the Pacific, through the seas which surround the North Pole, and the narrative is there brought down to the year 1858. We now add an account of

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in the subsequent voyages of exploration, and also of the expeditions sent out in search of Sir John Franklin and his associates.

In the year 1846 the British government sent out another expedition to the Arctic Seas for the purpose of discovery and settlement, under the command of Sir John Franklin. They sailed from the Thames on the 23rd of May, and on the 26th of July were spoken by the Prince of Wales whaler at the entrance of Lancaster Sound. In consequence of the ship not having been made ready in time, a series of searching expeditions were successively fitted out and sent to the Arctic Seas, all of which failed in the main object of finding the missing ships or their unfortunate crews, but one of which discovered the long-sought secret of a North-West Passage.

In 1848 the Enterprise and Investigator, under the command of Sir James Ross, were sent out, and reached Lancaster Sound on the 28th of August. They were not able to get farther west than Leopold Harbour, near the entrance of Prince Regent's Inlet, 73° 6' N., 90° 15' W., long, where they wintered. After the ships were liberated from the ice, they were swept eastward by a mass of drift ice into Lancaster Sound, and Sir James Ross brought the ships back to England early in November 1849. In 1848 Sir John Richardson and Mr. Rae made a voyage in boats from the mouth of the Mackenzie River eastward, but without success.

Another searching expedition was fitted out by the British government in 1849. Captain M'Clure was appointed to the command of the Enterprise, and Captain M'C lure to that of the Investigator. The two ships left the Thames January 10, 1849, and sailed in company round Cape Horn. Captain M'C lure reached Point Barrow, at the north of the Strait, on the 1st of February, 1849, and then bore to the east, just keeping clear of the American coast. Captain Collinson having failed to force his way through the pack-ice of Behring's Strait, sailed for Hong Kong, where he wintered. Captain M'C lure reached Charles Bar on the 4th of September. From this point high land was observed to the east-north-east, and named Baring Island. Two days afterwards, still farther to the east-north-east, more land was observed, and named Prince Albert Land. This land of Baring's Strait, with Barking Land and Victoria Land, and extends northward to 73° 31' N. lat. The Investigator was then navigated northward through a channel which separates Baring Island from Prince Albert Land, and which Captain M'C lure named Prince of Wales' Strait. In sailing up this strait the Investigator several times narrowly escaped destruction, but on the 8th of October was firmly frozen in near the northern extremity of the strait, and remained there during the winter. Parties were sent forth by the ship, and entertained the Investigator, who named Prince of Wales' Strait opens into Barrow Strait, and thus was made the first discovery of a North-West Passage.

On the 14th of July 1851 the Investigator was freed from the ice, and the great exertions were made to pass out of Prince of Wales' Strait. The ship made her way through the 13th of August, being then in 73° 14' N. lat., 115° 32' W. long, strong winds from the N.E. drove the masses of ice against the ship, and Captain M'C lure, thus baffled, resolved to sail southward back again down Prince of Wales' Strait. Having accomplished this, he sailed along the southern coast of Baring Island, and then northward along the western coast. At length, after incurring many risks and encountering difficulties which could only have been overcome by a rare combination of indomitable courage, admirable seamanship, and scientific resource, the Investigator, having rounded the whole island except a portion of the north shore, was got to the station which Captain M'C lure named Mercy Bay, September 24, 1851. This station is on the northern side of Baring Island, in 74° 6' N. lat., 117° 34' W. long., on the south side of Barrow Strait. Here then was the discovery of a second North-West Passage; and had there been open water in the east the whole voyage into Baffin's Bay might have been avoided, but the Investigator was frozen up in Mercy Bay on the very day it was entered. The north side of Baring Island was ascertained to be the Banks' Land which Captain Parry saw from Melville Island in 1818.

Melville Island is distant about 60 miles N. from Mercy Bay, and in April 1858 Captain M'C lure sent a travelling party across the ice to it, who deposited a document there, giving an account of the proceedings of the expedition, and of the position of the Investigator. In April 1853, only a few days before Captain M'C lure had made arrangements for deserting his frozen-up ship, the document was discovered by Captain Kellett's officers, and Lint. Pim, with a party of sailors carrying provisions, was sent from Melville Island to search for the Investigator. They were met with Captain Kellett from the time of her rounding Barrow Point in August 1850, where Captain Kellett was then stationed with the Herald, and who made Captain M'C lure a signal of recall, till April 1856, when Captain Kellett sent a party under Lieut. M'C lure and Captain of the Herald, the arrangement of the meeting may be easily imagined. Captain M'C lure remained with his ship till the spring of 1854, when he and his crew were brought to England by the ships belonging to Sir Edward Belcher's expedition. The Investigator, as far as is known, still remains frozen-up in Mercy Bay.

Captain Collinson, after wintering at Hong Kong, passed through Behring's Strait in 1851, and followed very nearly the track of Captain M'C lure up Prince of Wales' Strait, whence he also was obliged to return. He wintered in 1851-2 in 71° 36' N., 117° 36' W. long. The winter of 1852-3 was passed in Cambridge Bay, Wollaston Land, 69° N. lat., 105° 30' W. long. Still struggling on, the winter of 1853-4 found the Enterprise in 8° N., 145° 30' W. long. On the 15th of July, 1854, the Enterprise was released from the ice, when Captain Collinson commenced his return voyage. He reached Point Barrow on the 9th of August, and Point Clarence on the 21st.

The Arctic expeditions may be more briefly noticed. In 1850 Captain helmet with the Herald and Plover reached 72° 51' N. lat., 163° 48' W. long. In the same year the Advance and Rescue, two small brigs, were fitted out at the expense of Mr. Grinnell, an American merchant, and commanded by his son, a captain of the fleet at the entrance of Washington Harbour. In August, 1850, Captain Oommanny and Captain Penny conducted travelling parties by order of Captain Aultin, who commanded an expedition sent out by the British government. They many discovered that Sir John Franklin's expedition had passed the winter of 1845-6 at the mouth of the Wellington Channel, in a bay between Cape Ryle and Beechy Island. Captain Penny also explored the Wellington Channel to a distance of 80 miles from the mouth, and discovered a strait bearing to the north-west, which he named Victoria Channel. Dr. Rae and Commander Pullen also conducted expeditions in 1850.

In May, 1851, the Prince Albert, a small vessel, was equipped at the expense of Lord Franklin and placed under the command of Capt. William M. Pen, 70° 50' W. Albert passed through Lancaster Sound, and wintered in Bathy Bay in Regent's Inlet, on the east side of North Somerset. In March, 1852, Mr. Kennedy, with M. Bellot, an enterprising French navigator, made his way through the sheet ice of the northward along the east side of North Somerset till they reached Brentford Bay, which they ascertained to be a channel connecting Regent's Inlet with Victoria Strait, the northern part of which, called Peel Sound, enters Barrow Strait. They stated that they had fully proved that North Somerset is a large island, separated from Boothia Felix by the Brentford channel, which they named Bellot Strait, and found to be 15 miles long and 2 miles wide. They next travelled over the ice of Victoria Strait, and over Prince of Wales' Land due west as far 100° W. long., then northward to the south-east angle of Oommanny Bay, then eastward to Brown's Bay in Peel Sound, whence, following the coast-line northward they arrived at Cape St. John. All the officers of the Enterprise had left the ship on May 30th, after an absence of 96 days, and having travelled on foot and with sledges 1100 miles.

Captain Ingfield, in the small screw-steamer Isabel, sailed from the Thames July 6, 1855. He proceeded along the east side of Baffin's Bay, and eventually found that it contained two large openings to the north-eastward. He entered Smith's Sound at the head of Baffin's Bay, and on the 27th of August attained 78° 36' N. lat., where he wintered. The next year he gave the islands covered with ice. He was driven back by a violent gale, and afterwards entered Jones's Sound, which he penetrated to 84° W. long., the north coast there suddenly tending to the north-west, whilst the south shore continued its direction westward, and he could not by any means have reached the Isabel returned to England in November, 1852.

A searching expedition under Sir Edward Belcher was sent out in 1852. He proceeded up the Wellington Channel, and
wintered in 76° 52' N. lat., 97° W. long. While here explorations with boats and sledges led to the discovery of various countries never before visited. The northern side of this bay was named North Devon; the western side is Cornwallis Land, which is separated by a strait from Bathurst Land still farther west. A group of islands in 78° 10' N. lat., was named named Missions Land, and Sir E. Belcher found the sea open in the latitude of James's Strait. His words are, “Polar Sea as far as the eye can reach.”

The gallant young Frenchman, Lieutenant Bellot, in attempting to convey the government despatches from Caledon to Sir E. Belcher, was blown from the top of a hummock of ice, and was drowned. Sir E. Belcher's ships were liberated from the ice July 14, 1853, and he returned to England the same year. In 1853-54, Dr. Kane, in the Arctia, passed through Smith's Sound, and reached 78° 43' N. lat.

In October, 1854, Dr. Rae returned suddenly to England from the vicinity of Boothia Felix, for the purpose of announcing to the British government that he had obtained some relics which had belonged to Sir John Franklin's companions. He stated that he had met with some Esquimaux in Pelly Bay, who were in possession of watches, silver spoons, telescopes, and other things, which had belonged to the officers and seamen of the Erebus and Terror. These he procured for the Government and to the scientific societies. He had also been informed that the Esquimaux had informed him, that in the spring of 1850 about forty of the ships' crews were seen (but not by Dr. Rae's informants) near the north shore of King William's Land; that they were dragging a boat over the ice, locked with ice, but it was较好的 indication that the party was returning from the north of the country.

The two expeditions which it was stated the Admiralty intended to send out in November 1854 were not sent. Lady Franklin, however, chiefly at her own expense, has sent out an expedition in the Fox, under the command of Captain M'Clinstock, which sailed from Aberdeen on the 1st of July, 1857.

The result of all these searching expeditions—of which we have only noticed the most important—has been the discovery of a passage from the Arctic Ocean to the Pacific Ocean, which may be entered from the Atlantic, or the Arctic Ocean, from the Pacific, namely, by the west coast of Baring Island, by the east coast of the same island, through Prince of Wales Strait, by Regent's Inlet through Bellot Strait into Victoria Strait, and probably also by Peel Strait into Victoria Strait. These passages, being all more or less encumbered with ice, may be of little or no commercial importance; but the long-sought North-West Passage has been discovered, many expeditions have been sent on, and the climate and soil of these islands and countries have been found and partly examined. Besides the geographical discoveries which have been incidentally noticed in the course of this narrative, it has been ascertained, by the explorations of Dease and Simpson, in 1821-23; of Henry, in 1849; by Dr. Kane, in 1853; and by Dr. Rae, in 1854-55, that the Victoria Land are continuous, forming the south coast of the largest of all the islands of the Arctic Sea, the western boundary being Prince of Wales' Strait, the eastern boundary Victoria Strait with its continuation Peel Strait, and the northern boundary Barrow Strait. The northern coast of this large island is deeply indented near the eastern end by Ommanney Bay and Osborne Bay, so named from the explorers. North Somerset is also, as has been stated, a large island, separated from Boothia Felix by Bellot Strait, previously called Brentford Bay; whilst Boothia Felix has been ascertained to be united to the American continent by an isthmus.

In many parts of these cold regions there is an extraordinary abundance of animal life, consisting of moose-deer, hares, ptarmigan, and other game. In 1851, Captain M'Cline says, “On the 1st of April we had 1000 lbs. of venison hanging at the yard-arms;” and in 1853, he says, “A supply of game has been sent up from Boothia Felix by Bellot in the winter, which has enabled us to issue a man twice weekly.” It seems also to have been ascertained, that north of Smith's Sound and the Wellington Channel there is an extensive Polar Sea, comparatively unencumbered with ice, which was seen by Dr. Kane.

NORTHERN SOVEREIGNTY. This name has been given, but perhaps not definitely, to an extensive tract of country which was annexed in 1848 to the British possessions in the north-west of the Drenthenberg Mountains, between the two great branches of the Orange River, the Ky Gareep and the Na-Gareep, comprising a triangular area of about 50,000 square miles.

The Drenthenberg Mountains, called also the Quattlibha Mountains, run parallel with the eastern coast of South Africa, at a distance varying from 60 to 90 miles from the shore. They rise to a height of from 6000 to 6000 feet, and tower over peaks and rocky ridges, interrupted only by ravines and gorges. The coast is for the greater part barren, and consists of a series of wide plateaus, which, sloping gradually downwards towards the lower coast of the Vaal River, terminate in plains of vast extent, sometimes containing numerous isolated and rocky hills, but generally quite flat and without trees. These vast plains are for the most part without a single human inhabitant, but afford abundant means of subsistence to countless herds of antelopes, quagga, and other wild animals. All the rivers fall ultimately either into the Kafir or into the Vaal River, and thus flow from north to south, and from west to east. The Vaal River, rising between 26° and 27° S. lat., and 39° E. long., about 300 miles W. of Delagoa Bay, in an interior range of mountains bounding the great plains of the north, flows east, south, and south-west till it meets the N. Gareep.

The principal affluent of the north is the Caledon; from the south it receives the Stormberg River, the Oorlogs, the Zeekee River, and others of less importance.

This portion of the continent, being remote from the sea-coast, receives its rain in thunder-storms, chiefly during the winter months, of which December and January are the wettest; the climate is cold, the climate and soil are then characterized by great dryness, though copious dews fall at night. The smaller rivers are dried up, and the ponds and lagoons are converted into swamps.

The White-Faced Antelope (Antilope albirostris), the Spring-Bok (A. euryceros), the Gnu (A. gnu), and the Quagga (Equus Quagga) seem to be in the greatest abundance. They are often seen in countless herds covering an immense extent of land, and grazing in the same place for months together. They are less numerous, and with buffaloes. Hyenas are abundant. Lions are very common. The hippopotamus is very common in the larger rivers. Ostriches appear on the great plains in considerable numbers. Timber grows on the slopes of the mountains, and the rivers are shaded with willows, lagoons and salt-marches, and some of the plains are covered with an incrustation of salt.

The white population is estimated to be about 6000, who are chiefly the residue of the Dutch farmers who, in the years following, emigrated from the Cape Colony, and are settled in villages and in small groups near the rivers. The native population is supposed to amount to about 100,000, who mostly inhabit the Malati Mountains. The Bushmen live among the isolated hills of the interior. The Grahmas, who are a mixed breed, arising from the intercourse of Europeans with the natives, are in considerable numbers. They are mostly settled along the banks of the N. Gareep, on the shores of Lake N. Gareep.

The colony has been distributed into four districts—Bloom Finetain, Caledon River, Winburg, and Vaal River. The principal town is Bloom Finetain; situated in 39° 8' S. lat., 36° E. long., on the high road from the Cape Colony to Natal. It is about 340 miles N. from Graham's Town. It contains about 1000 inhabitants; has an Episcopal church, a Wesleyan Methodist chapel, and barracks. Smithfield, Winburg, and one or two other villages, are inconvenient places. There are three or four mission-stations belonging to the British, French, and German churches.

The country appears to be well adapted for sheep pasturing and the production of wool. The climate seems to have a favourable influence on the fineness of the fleece. Small quantities of gold have been found in the neighborhood of Smithfield.

When the Dutch inhabitants of the Cape Colony emigrated
NYC

from it in 1836 and following years, they settled themselves at first in various parts of the territory which is now named the Northern Sovereignty. In 1838 a party of them went to Naafs, where they were treacherously murdered by the warriors of the chief Dinpann. [Nata, S. 9.] When the Dutch, who had conquered the natives and declared a republic, were obliged in their turn to submit to the English in 1842, the greater part of them fled into the Northern Sovereignty, where they founded the village called Winburg, and proclaimed a new Dutch republic. Little notice was taken of their proceedings till they began to expel from their farms the Dutch farmers who continued to acknowledge the British supremacy, and in 1845, under their leader Pretorius, prepared a large expedition to attack Adam Kok, a Griqua chief in alliance with the British. The chief applied to the colonial government, and two regiments were immediately sent to his assistance, who repulsed the revolutionary Dutch boers. On the 1st of February 1845, Sir Harry Smith, with the assent of the well-affected boers, erected the whole of the territory inclosed by the Ky Garsep and the Nu Garsep into a British colony. This led to another contest, in which Sir Harry Smith defeated Pretorius and his adherents on the 30th of August, 1845. Pretorius fled beyond the Vaal River, and the majority of the boers laid down their arms and submitted to the British government.

NORWOOD. [Surrey.]

NOSE, one of the external apertures of the respiratory system and the organ for the sense of smell. The portion of the nose by which odours are perceived, lies deep back in the cavity to which the external apertures of the nostrils lead; the portion which is prominent upon the face serves merely as the apparatus for inhaling the air which is impregnated with the odour. The most essential parts of the organ are the olfactory nerves, which come off from the olfactory root of the brain [Brain], and passing through numerous holes in the ethmoid bone, which is situated between the orbits and above and behind the nostrils, ramify on the extended surfaces of that bone and the turbinate bones which form on each side the chambers of the nose. The sensitive terminations of the nerves are placed on the surface of a delicate and very vascular membrane which lines the whole cavity of the nose, and which is constantly kept moist by the secretion of a small quantity of mucus, in which the odorous particles are caught and for a time retained.

The sense of smell varies considerably, both in degree and in kind, in different animals. It is evidently possessed by insects and many others of the lower animals, but the organs by which they exercise it are unknown. In the higher animals its degree of acuteness is in general marked by the extent of surface of the ethmoid and turbinate bones, over which the olfactory nerves are distributed. In man this surface is proportionally smaller than in other animals, in most of which, besides occupying the greater part of the interior of the face, it is increased by peculiar branchings and convolutions of the thin layers of the bones. Each species has also a sense of smell in some degree peculiar to itself; thus herbivorous animals, though possessing the most delicate power of discerning the differences of vegetable odours, have no evident faculty of discriminating those of most animal substances; while the carnivores, on the other hand, can scarcely distinguish any others than the last. Each species has a fine sensibility for those substances which are of the greatest importance to its own existence, and thus obtains at once a knowledge of their presence in places concealed from all the other senses. Man possesses the sense of smell for a very large number of substances, but not in a very acute degree for any of them. The difference appears the greater between him and other animals in consequence of the neglect of the exercise of this sense which is common (except for particular purposes) in civilized society; but the American Indians and some of the northern Asiatic tribes, by their constant practice in hunting, are said to have acquired a power of scent scarcely inferior to that of the dog.

The olfactory nerve is appropriated exclusively to the sense of smell, and is incapable of perceiving pain or any other sensation. Of the peculiarities by which in different animals it is capable of perceiving only certain odours, we know no more than of the nature of those odours themselves, of whose existence we have no other evidence than that of the sense which they affect.

The sense of smell serves as an adjunct to that of taste, and is subservient in most instances to the same purpose, of providing proper and avoiding injurious food for the sustenance of the body. By it many animals seek out their food, and all select from that which they obtain; and much of that composed sensation which we regard as taste is really due to the smell, as for instance the sensation of the flavour of aromatic substances, which is completely lost by closing the nostrils while we are eating them.

For the full perception of odours it is necessary that the particles charged with them should be drawn with some force into the nose, and we may stand for some time in a very strongly smelling atmosphere without perceiving it if we breathe only through the mouth. The most acute sensation is obtained by the sudden inhalation of a large quantity, or by a succession of short and quick inspirations.

NOTONECTA, a genus of Insecta belonging to the family Hydrocoris, of the order Hemiptera. N. planca, the Water-Boatman, is one of our commonest insects. It is about half an inch long, and swims upon its back in order the better to seize its prey.

NUNEATON. [Warwicks.] Usus. [Nys.] NUTRIENT, NUTRITION. [Food, S. 2; Tabaks, Orios, S. 1.]

NYCTAGINACEÆ, a small natural order of Hypoquysous Exogenous Plants, belonging to Lindley's Cenopodal Alliance. They have a tubular often coloured calyx, which separates from its base, the latter becoming a hard spurious pericarp. The species are annuals or perennials often with fleshy roots, or shrubs or trees usually articulated at the tnmid nodes, Mirobellia dichotoma, the Marvel of Peru of our gardens, may be taken as the type of the order. M. jalapa was at one time supposed to be the plant, yielding true jalap. This however is a mistake. [Convolvulaceœ.] The roots of the plants of this order are generally purgative. They are natives of the warmer parts of the world in either hemisphere. They are tropical or subtropical. The order is related to Polygonum, Amaranthaceæ, and Cannabinaeœ. It contains 14 genera and about 100 species.
OAKINGHAM, or WOKINGHAM. [Berks.] OAT. [Avon.]

OA. [Avon.]

OATH. The privilege long enjoyed by Quakers, Moravians, and Separatists in giving their evidence upon solemn declaration, is by the Common Law Procedure Act, 1854, extended to all witnesses, who conscientiously object to be sworn. A wilfully false declaration in all these cases involves the party, by the provision of the statute, in the same punishment as perjury. 

OCCUPATIONS OF THE PEOPLE. The importance of obtaining as specific and complete an account as practicable of the pursuits and employments of the inhabitants of this country has long been recognised; and in each decennial census of the present century it has been attempted, with constantly increasing efforts after greater fullness and precision, to ascertain the number and proportion of the persons engaged in agriculture, commerce, the various trades, manufactures, and professions. In the enumerations of 1811 and 1831, inquiries were instituted as to how many families were employed in, or maintained by, agriculture; how many by trade or manufactures; and how many which could not be brought under either of these designations. The answers to these inquiries were given with tolerable fullness. In 1831, it was resolved to ascertain, so far as could be done, the occupation of every male adult twenty years of age or upwards. On that occasion a form, containing a list of one hundred different trades and handicrafts, being those most commonly carried on, was furnished to the overseers in each parish or place required to make a separate return, to be filled up with the number of males aged twenty and upwards; and the overseers were authorised to add to the list such additional trades as were wanted in the printed form. But many anomalies and imperfections arose out of the plan; and it was therefore resolved, in 1841, that the enumerator, instead of using a prepared list of one hundred, or any other definite number of trades, should insert each man's description of himself opposite his name. This led to some curious results. In the more important manufactures, the subdivisions of labour entered in the schedules were so minute, that there were no less than 1282 distinct heads of employment (some of them, it is true, identical) in the cotton manufactures of Lancashire in 1831 the enumerators had entered only 689 for the whole of the country. In like manner, the London occupations, given as 420 in 1831, were 757 in 1841; and the occupations of Great Britain became similarly increased from 3065 to 3777.

In 1851, to use the words of the Registrar-General, to whom the management of the census of that year was entrusted, "it was considered important to extend the inquiry, so as to show, as nearly as was practicable, the number of men, women, and children in every trade and profession," and it was further held to be desirable, notwithstanding the great additional labour entailed in abstracting and tabulating the results, "not only to take out the number of persons of each sex in each occupation, but the numbers at each quinquennial period of age; for without this information the relative salubrity of the professions, and a great variety of important questions, cannot be determined." The results of the inquiries instituted are embodied in a bulky but very able report, drawn up by the Registrar-General, which examines the subject as a whole and in detail from various points of view, and in numerous elaborate tables presents the results as digested after a vast amount of labour and consideration.

We proceed to exhibit some of the results obtained, selecting such as will illustrate various industrial phases of British population.

In looking at the tables with regard to the more general results, there are many interesting particulars which become developable. The total population of Great Britain and the small adjacent islands, is set down at 20,923,477, of whom 10,923,608 are males, and 10,759,899 females. One-half of this total is 10,470,738.

Now this is almost exactly identical with the number (10,418,989) of those domestic servants, or of widows, daughter, grand-daughter, sister, niece, son, grandson, brother, nephew, child under tuition at home, child under tuition at school; that is, persons to whom no occupation whatever is attributed, but who are regarded as dependent on the head of the family for support. Regarded in this light, therefore, just one-half of the population have nothing and do nothing to earn a living; they are the home-members of a family; they may assist in domestic labours, but they do not work at money-getting employments. There are then left half the population, who either possess wealth already accumulated, or exercise their hands and heads in the acquisition of wealth. This is one moiety can, with a near approach to correctness, be divided into five equal parts, thus—

About 1,000,000 domestic servants.
1,000,000 employed in preparing the materials for dress.
1,000,000 employed in making dress.
1,000,000 ordinary agricultural labourers (males).
1,000,000 other persons; male and female, living by farm and field operations.

Most of these numbers are slightly over the million. If we suppose the two millions of farmers, graziers, gardeners, and in-door and out-door farm servants of every kind, to be all employed in raising food (and this is not such a wide departure from the truth as to vitiate such general results as we have now in view) it brings us to this conclusion: of the total population, about 21,000,000, there are—

Of family dependants, having no definite occupation
1,000,000 about one-half.

Of persons supplying dress, food, or domestic service
1,000,000 about one-quarter.

Of persons employed in all other occupations
1,000,000 or more.

When the Commissioners came to prepare their vast tables of the distribution of occupations in the respective divisions, counties, districts, and towns, they had to determine how many different occupations should be given in each table. If the whole 1007 occupations, presently to be adverted to, for males had been tabulated for each and all of the topographical sections, the volumes would have been numerous and bulky beyond all endurance, the labour and expense enormously great, and the practical value very questionable. The list was therefore weeded. Several occupations were omitted which were only very limited in their topographical distribution, and all were omitted in which the total number of persons is very small. Different degrees of minuteness were adopted, according to the nature of the table. Thus, one table, for the whole of Great Britain, gives all the 1007 occupations in alphabetical order, distinguishing the workers who are above and those who are below 20 years of age, but not distinguishing the sexes. Another table, going as low down in classification as sub-classes, shows in respect to these the ratio or percentage of males under 20, males over 20, females under 20, and females over 20: this is done with a view of exhibiting, in a broad and general way, the extent of female labour and of juvenile labour in Great Britain. Lastly, a fourth table, or rather group of tables, gives the occupations of the people in all the 13 divisions of Great Britain, in all the counties, in all the 893 Registration Districts, and in 86 of the principal towns.

We proceed now to give some idea of the nature of the classification adopted.

The primary division, it must be understood, is into 17 groups or classes of occupations, having definite occupations, and these are again divided into 91 sub-classes, rather more than five to a class on an average. Thus—

1. Persons engaged in the general or local government of the country.
   b. Local government.
   c. East India government.

II. Persons engaged in the defense of the country.
   a. Army.
   b. Navy.

III. Persons in the learned professions.
11. In machines.
12. In carriages.
13. In harness.
15. In mines.
16. In implements.
17. In chemicals.

XI. Persons working and dealing in vegetable substances.
1. Vegetable food.
2. Drinks and stimulants.
3. Gums and resins.
4. Timber.
5. Bark.
6. Hemp.
7. Silk.
8. Tobacco.
10. Rice.
11. Sugar.

XII. Persons working and dealing in minerals.
1. Coal.
2. Stone and clay.
3. Earthenware.
4. Glass.
5. Salt.
7. Precious stones.
8. Gold and silver.
9. Copper.
10. Tin.
11. Zinc.
12. Lead.

XIII. Persons engaged about animals.

XI. Persons engaged in art and mechanical productions.
1. In books.
2. In plays.
3. In music.
4. In pictures.
5. In carving and figures.
6. In the making of games.
7. In plans and designs.
8. In medals and dies.
9. In cameras and philosophical instruments.
10. In arms.

The above, it must be remembered, are the 91 sub-classes of male occupations. The sub-classes of female occupations are not quite so numerous, and differ a little (but only a little) in designations.

The 17 classes, or 91 sub-classes are further subdivided into no less than 1072 occupations or employments, giving an average of about twelve to each sub-class, or sixty-two to each class. These are occupations for males only; but there is a separate specification for females, amounting to 746 employments. These are, of course, in some cases identical with those of men, in other cases nearly alike but differently named, while in others they are wholly distinct and form a class by themselves.

Many of the classes cannot be rightly understood until the sub-classes into which they are divided have been examined; and even then, there are two or three against which grave doubts may be urged, as to the principle on which the aggregation of these has been determined. These are classes 9 and 11, and are those here adverted to. This, however, is a matter on which opinions will inevitably clash; for, where offices and employment differ one from another by imperceptible gradations, and where each one may be regarded under many aspects, no one can give a definition which is the classification; we can only adopt a classification, convenient according to the views of him who makes it. The commissioners, for instance, made class 9 to comprise "people who are principally engaged in lodging, entertaining, attending, or providing articles of dress, so as to be brought much into personal contact with those whom they serve." This reads well, in so far as it provides a chain of connection among employments which relate especially to the person; but the sub-classes give it a more satisfactory effect; for, we should expect inns-keepers, coffee-house keepers, eating-house keepers, lodging-house keepers, domestic servants, inn-servers, under-takers, dress-makers, shoe-makers, nursery-maids, rag-gatherers, and washer-women, to be all included in one class, as they are here. Among class 4, we find, the poet, the historian, the painter, the sculptor, the musician, the architect, and the natural philosopher, as well as the professors and teachers of literature and science; while class 11 comprises "those engaged in the higher class of mechanical and chemical arts, intimately connected with artists and men of science, from whom they frequently, either directly or indirectly, derive materials, direction, or inspiration; they multiply copies of original works." Now this analysis has evidently been much studied and elaborated by the commissioners; but it leads to strange results when worked out in detail; for we find the music-master in one class and the musician in another, the painter in one and the engraver in another, the architect in one and the surveyor in another. While publishers, printers, actors, musicians, engravers, carriers, modellers, showmen, civil engineers, pattern-designers, die-sinkers, watch-makers, gunsmiths, machinists, coopers, saddlers, shipwrights, builders, wheelwrights, dyers, scissorers, calenders, and chemical manufacturers, are all placed together in one class.

Taking the 1057 occupations for males, just as they stand in the classified tables, the highest numbers are the following, comprising those exceeding 40,000 persons in each employment:

### Agricultural labourers
1,006,728

### Laboureuse (undefined)
367,472

### Farmers
267,657

### Showmen
243,002

### Farm servants, indoor
235,943

### Cotton spinners and weavers
222,612

### Calenders
216,366

### Carpenters
192,346

### Tailors
135,028

### Blacksmiths
112,154

### Masons
101,351

### Porter and messengers
97,642

### Merchant seamen
89,306

### Woolen spinners and weavers
86,649

### Drawer
78,215

### Gardeners
78,492

### Grocers
68,542

### Butchers
65,912

### Plumbers, painters, and glaziers
62,421

### Carpenters and joiners
56,252

### Bakers
55,663

### Websters and spinners and weavers
51,963

### Engineers and machine-makers
40,030

### Silk spinners and weavers
34,169

### Clerks (commercial)
34,741

Among females, of 80 years of age and upwards, the highest numbers placed opposite definite occupations are the following:

### Domestic servants (general)
401,850

### Milliners
292,437

### Cotton spinners and weavers
234,212

### Women and maidservants
136,382

### Farm servants, indoor
76,388

### Out-door
56,067

These numbers, however, must not be used for any inferential purpose, without taking others belonging to employments very nearly connected with them. Thus, the 401,950 general domestic servants do not include about 200,000 others who enter themselves under the special designations of housekeeper, housemaid, cook, nurse, and inn servant; the 50,942 general milliners does not include the 89,504 and 67,504 and 29,000 needlewomen and needlewomen of other kinds; and so in other cases. It must also be borne in mind, in respect both of the male and the female lists, that the highest numbers are attached to designations which are rather degrees of relationship than occupations in a strict sense, we are told.

Wives (not otherwise specified)
2,631,380

Children and relations at home, ditto
4,745,217

Children who attend school, ditto
2,752,787
Here we have at once more than a third of the entire population entered under three headings, excluding everything like a business designation.

As a summary of results relating to occupations generally, without regard to age, sex, or topographical direction, it may be added, applicable to the manufacturing table, containing the Commissioners' own enumeration of the number of persons employed in 108 avocations in Great Britain, comprising all those for or in respect of which the numbers exceed 10,000: more domestic relationship, such as 'wife,' 'widow,' &c. is not here taken into account; all such domestic occupations, in the usual meaning of that word—male or female, adult or juvenile.

Occupations in Great Britain, and Number of Persons Engaged in them (arranged in the order of the Numbers), in 1851:

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural labourers</td>
<td>6,480,098</td>
</tr>
<tr>
<td>Bricklayer, shipyard</td>
<td>1,462,000</td>
</tr>
<tr>
<td>Domestic</td>
<td>8,851,345</td>
</tr>
<tr>
<td>Cotton, calico, manufacture</td>
<td>36,045,000</td>
</tr>
<tr>
<td>Earthenware</td>
<td>3,354,000</td>
</tr>
<tr>
<td>Labourer, branch unclassified</td>
<td>18,050,000</td>
</tr>
<tr>
<td>Mson (not mason)</td>
<td>2,370,000</td>
</tr>
<tr>
<td>Moos (not mason)</td>
<td>1,374,000</td>
</tr>
<tr>
<td>Oil manufacture</td>
<td>3,180,000</td>
</tr>
<tr>
<td>Bhd. and mason</td>
<td>4,310,000</td>
</tr>
<tr>
<td>Wool manufacture</td>
<td>12,610,000</td>
</tr>
<tr>
<td>Mason, house, etc.</td>
<td>2,420,000</td>
</tr>
<tr>
<td>Messenger, porter, errandman</td>
<td>1,020,000</td>
</tr>
<tr>
<td>Linen, flax, hemp, etc.</td>
<td>9,060,000</td>
</tr>
<tr>
<td>Farm servant (merchant)</td>
<td>6,900,000</td>
</tr>
<tr>
<td>Grocer</td>
<td>6,781,000</td>
</tr>
<tr>
<td>Gardener</td>
<td>3,000,000</td>
</tr>
<tr>
<td>Ironmonger, ironmonger, etc.</td>
<td>7,500,000</td>
</tr>
<tr>
<td>Tinsmith, plasterer, etc.</td>
<td>8,000,000</td>
</tr>
<tr>
<td>Schoolmaster, misters, etc.</td>
<td>8,000,000</td>
</tr>
<tr>
<td>Lace manufacture</td>
<td>8,000,000</td>
</tr>
<tr>
<td>Fbr. painter, glazer</td>
<td>8,000,000</td>
</tr>
<tr>
<td>Carman, carter, carrier, etc.</td>
<td>8,000,000</td>
</tr>
<tr>
<td>Charwoman</td>
<td>5,000,000</td>
</tr>
<tr>
<td>Dyer (tint and colour)</td>
<td>5,000,000</td>
</tr>
<tr>
<td>Kings &amp; machine mfr.</td>
<td>5,000,000</td>
</tr>
<tr>
<td>Commercial clerk</td>
<td>4,700,000</td>
</tr>
<tr>
<td>Cabinet-maker, joiner</td>
<td>4,000,000</td>
</tr>
<tr>
<td>Tannery, butler, clerk</td>
<td>4,000,000</td>
</tr>
<tr>
<td>Boots, barge, man, woman</td>
<td>3,000,000</td>
</tr>
<tr>
<td>Millers</td>
<td>3,000,000</td>
</tr>
<tr>
<td>Barrel-makers, etc.</td>
<td>2,000,000</td>
</tr>
<tr>
<td>Sawyers</td>
<td>2,000,000</td>
</tr>
<tr>
<td>Railway labourers</td>
<td>2,000,000</td>
</tr>
<tr>
<td>Bricklayer, draker</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Cow-keepers, menders</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Mawer, pedlar</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Grocers</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Glove-makers, etc.</td>
<td>1,000,000</td>
</tr>
</tbody>
</table>

Leaving these general results, which apply for the most part to the whole of Great Britain, and to the whole circle of occupations, we proceed to notice a few of the results having a somewhat more special character. One of these has relation to the employment of the many by the few, and another to farms, farmers, and tenant farmers.

One of the valuable results of the Census of 1851 is the determination, to a certain degree of correctness, of the relative positions of employers and employed; a classification of masters and men in giving occupation. The Commissioners were imperfectly filled up; but the general result approximates on the whole pretty nearly to accuracy. We may solve many interesting questions by means of the tables thus produced. For instance, let the question be this—How many occupations are there in which some of the masters employ 350 hands or more? They are the following:—shoemakers, glovers, stockers, weavers, engine and machine makers, builders, carpenters, distillers, drapers, corn dealers, criminals, and manufacturers, in the usual meaning of that word—male or female, adult or juvenile.

It is in Lancashire chiefly that the factories are situated in which the largest number of persons are employed. This might be expected, knowing, as we do, on how gigantic a scale the cotton-mills of that county are conducted. No less than 106 of the Lancashire mills employ more than 350 hands each; how much more, is not stated in detail. There are also 100 others in the manufacturing counties, of which the number is at least 350 work-people.

In London the number of work-people employed by the respective masters differs, of course, from that observable in country lists, since the predominant trades there are in a different state. Taking 100 as a minimum, it may be asked,—Which are the London trades comprising the greatest number of masters who employ 100 men or more each? We find that there are altogether 86 such masters—a smaller number than might at first perhaps have been supposed. Of these, there are 22 builders, 6 engineers, 5 shoemakers, 5 printers, 4 painters and glaziers, 3 piano-forte manufacturers, 2 of bookbinders, gunsmiths, masons, tanners, silk manufacturers, drapers, tobacco manufacturers, and similar persons. It may be added, that in this metropolis, there is not one entered with so many as 50 men in his employ; among distillers and rectifiers, not one with so many as 20; evidently there are great omissions here. Again, when we find that there are only 8 vineyard makers, 3 dye manufacturers, 1 lawyer, entered as employing any persons at all, it is still more manifest that many of these returns were incomplete. The explanation is doubtless to be found in the statement prefixed to the Tables: 'Many of the returns were, in fact, so incomparably short that we had directed the whole number—omitted to attend to this instruction (directing that the master is to be distinguished from journeyman, and that the number of persons in the employ of the master is to be added, not to their own, but to all the others, or the number of hands employed in particular trades, as carried on in London. This may be generally the case, and accordingly we have directed the attention, are sufficient to show that great caution is necessary in drawing deductions, as in some cases they would certainly be by no means just ones.

The small tradesmen in the metropolis are, in many respects, the best customers of all, on account of their large number. The small chamber-masters, or small shopkeepers who employ each not more than two journeymen, or two apprentices, or one journeyman and one apprentice, are surprisingly numerous, showing how to great a degree master-
ship is diffused in the metropolis. We give the following table of chief trades followed by Masters who employ 1 or not more than 2 Journeymen or Apprentices.

<table>
<thead>
<tr>
<th>Bakers</th>
<th>Tailors</th>
<th>Tailors</th>
<th>Tailors</th>
<th>Shoemakers</th>
<th>Shoemakers</th>
</tr>
</thead>
<tbody>
<tr>
<td>842</td>
<td>640</td>
<td>644</td>
<td>588</td>
<td>224</td>
<td>242</td>
</tr>
</tbody>
</table>

The table is to be understood thus: that in the above eight occupations there are 3163 masters in the metropolis, who employ either one or two persons each. Of those, still lower in the social scale, who claim mastership only over their own individual labour, the numbers run in a somewhat different order, beginning with a shoemaker (the 'cobbler who lives in a stall') and, perhaps, going thence to the tailor, the butcher, the baker, the grocer, the carpenter. But these numbers include also those masters who made no definite returns at all.

In respect of agricultural pursuits, the Commissioners sought to obtain a return of the number of farms, the size of the farms, and the number of persons engaged in them. The following is a convenient general outline of the result:

<table>
<thead>
<tr>
<th>Size of Farms</th>
<th>Number of Farms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acres</td>
<td>Great Britain</td>
</tr>
<tr>
<td></td>
<td>England and Wales</td>
</tr>
<tr>
<td></td>
<td>Scotland</td>
</tr>
<tr>
<td></td>
<td>Islands in British Seas</td>
</tr>
<tr>
<td>Total</td>
<td>263,378</td>
</tr>
<tr>
<td>Under 100</td>
<td>100,873</td>
</tr>
<tr>
<td>100-200</td>
<td>102,192</td>
</tr>
<tr>
<td>200-300</td>
<td>20,658</td>
</tr>
<tr>
<td>300-400</td>
<td>30,303</td>
</tr>
<tr>
<td>400-500</td>
<td>4,043</td>
</tr>
<tr>
<td>500-600</td>
<td>2,048</td>
</tr>
<tr>
<td>600-700</td>
<td>2,186</td>
</tr>
<tr>
<td>700-800</td>
<td>2,132</td>
</tr>
<tr>
<td>and upwards</td>
<td>38,849</td>
</tr>
</tbody>
</table>

Besides the above, there were 2956 farms of which the sizes were not stated in the returns; making 265,836 farms or farm-holdings altogether. It is found that large farms prevail most in the North, and in Norfolk and Suffolk. The average size of all the farms is 102 acres; and, taken in the aggregate, they occupy just about one-half of the territory of Great Britain. Two-thirds of the farms are less than 100 acres each in extent. About 9000 small farmers seem to have no labourers except the members of their own families; about 30,000 farmers employ more than 60 labourers each; while all the rest have in their service a number varying from 1 to 60.

Professional avocations, as distinguished from trading and manufacturing, are now being created facts, which may be put together in the following form:

<table>
<thead>
<tr>
<th>Occupations</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common callings</td>
<td>575</td>
<td>1,175</td>
</tr>
<tr>
<td>Clergymen of national churches</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Clergymen</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Judges</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Barristers, advocates, &amp;c.</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Solicitors, attorneys, &amp;c.</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Law students</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Lawyers</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Artists, architects, &amp;c.</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Learned persons</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Persons engaged in the medical profession</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Physicians</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Surgeons and apothecaries</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Medical practitioners</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Students and assistants</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>368</td>
<td>1,142</td>
</tr>
</tbody>
</table>

As before noticed, there is more confusion between Class 4 and Class 11. In the list here given, although artists are exclusively of the latter, but not singers or dramatisers are, but not actors. In order, therefore, to make our enumeration somewhat more complete, we must bring in a few items from Class 11, still comprising them among "persons engaged in literature, fine arts, and sciences."

<table>
<thead>
<tr>
<th>Occupations</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artists, architects, &amp;c.</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Learned persons</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Persons engaged in the literary, fine arts, and sciences—</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bakers</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Tailors</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Shoemakers</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Persons engaged in the metropolis</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Clergymen</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Judges</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Barristers, advocates, &amp;c.</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Solicitors, attorneys, &amp;c.</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Law students</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Lawyers</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Artists, architects, &amp;c.</td>
<td>368</td>
<td>1,142</td>
</tr>
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<td>Learned persons</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Persons engaged in the medical profession</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Physicians</td>
<td>368</td>
<td>1,142</td>
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<tr>
<td>Surgeons and apothecaries</td>
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<td>1,142</td>
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<td>1,142</td>
</tr>
<tr>
<td>Students and assistants</td>
<td>368</td>
<td>1,142</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>368</td>
<td>1,142</td>
</tr>
</tbody>
</table>

But the total of the Queen's forces, at home and abroad, naval and military, officers, &c., was 220,000.

It is necessary to bear in mind that many dissenting ministers are, in the Census returns, entered under the occupations which they follow during the week.

Persuaded in respect of the numbers engaged in various professions. The Census Reports are those which establish a comparison between different parts of the country. Large generalisations may be made from the tables which relate to the whole of Great Britain; but for comparison and analysis, the sectional tables will have a peculiar value of their own.

In reference to a particular department of occupation, or a particular social relation, we may wish to know how far England, and Scotland, and Wales, differ from one another in characteristics; in what way the 40 English Counties, 12 Welsh Counties, and 32 Scotch Counties exhibit peculiar characteristics; by what peculiarities the 19,149 registration districts or post-office unions of England and Wales are distinguished; and so forth. The voluminous Census tables afford a store of information on all these local details.

Of course, when different districts or portions of the kingdom are treated separately, the metropolis comes in for the first notice; the following, then, is a rough outline of employments generally in the metropolis. Confining our attention, at present, to males, and to males only of 20 years and upwards, we have the following:

- 5,466,815 males of 20 years and upwards in Great Britain, 632,545 live in the metropolis; that the London shoemakers number 26,639, and the London tailors, 20,527; that there are no fewer than 25,708 domestic and inn servants; that the commercial establishments are so numerous and so extensive as to employ 15,135 clerks and travellers; that the coachmen, drivers, carriers, waggoners, draymen, and others who drive vehicles through the London streets, number more than 17,000, besides 14,000 messengers and porters, in addition to railway, canal, and river servants; that there are, for housework, 21,174 carpenters, 13,817 painters and glaziers, and 16,038 bricklayers and plasterers; that among those who supply us with food and drink, are 9841 bakers, 7455 butchers, 3878 drapers, 6473 grocers, 3612 mill-sellers, 3235 greengrocers, 2923 fishmongers, and 2156 cheesemongers; that the leather trades, chiefly in Bermondsey, employ 5391; that there are 13,906 persons employed in printing, binding, and selling books; that the wood-furniture makers and sellers number 13,574; and that there are more than 40,000 labourers whose branch of labour is undefined, but who must be distinguished from skilled artisans.

Let us next, still confining our attention to the metropolis, glance at the female occupations in a similar way. Among the 9,093,646 females, aged 20 years and upwards, employed in Great Britain, 768,418 are in London. Of this number, 316,517 designate themselves simply as wives, and 65,677 simply as widows, and about 40,000 as daughters, without any reference to the particular occupation. But of those who appear to earn their living by the labour of their own hands or brains, there are no fewer than 116,666 domestic servants of various
kinds, 73,620 needlewomen of various kinds, and 45,764 charwomen, washerswomen, and manicures. These, with 50,181 housemaids, constitute a class of domestic servants, which comprise all the large items among the female adult population of the metropolis; all the other items are, individually, very small. These facts are not without their instruction; for they show how limited is the range of female employment in London, and how large is the number of independent and self-supporting females, those who are dependent on relations for support, and those of independent means, there were 330,000 adult females in London in 1851 dependent on their own exertions for their daily bread also, and they show also how a large number of families in comfortable circumstances in London, to give employment to nearly 130,000 female servants, and 45,000 laundry- and char-women.

The census returns, therefore, how far a differential principle seems to determine the distribution of occupations. We take the cotton-spinning county of Lancashire. Here we have 550,076 males of 20 years of age or upwards, against 1,182,000 in the metropolis; that is, in the ratio of about 55 to 100. Different indeed, however, is the ratio in regard to employment. We have seen that the metropolis contains about 26,000 male adult servants, 31,000 drivers and porters, 27,000 shoemakers, 21,000 carpenters, 20,000 tailors, 12,000 bricklayers, 10,000 coachmen, and 20,000 in Lancashire, these eight occupations exhibit the numbers 4708, 9127, 15,443, 12,146, 11,346, 7658, 7643— all far below the ratio in respect to total inhabitants. In London there are 33,000 persons in the public service, receiving contributions from the common funds; whereas in Lancashire there are only 11,000. In London there are 24,000 professional men, engaged in divinity, law, physic, science, and fine arts; in Lancashire the number is 11,000. In London there are 14,500 persons employed in writing, printing, binding, and selling books and periodicals; in Lancashire there are 2,000. All these numbers, it is evident at a glance, differ widely; London having far more than its ratio of 100 to 86 in each of these employment. But let us examine each of the classes more closely, and we shall find Lancashire takes precedence of the metropolis. Of course, in a county, farmers, graziers, shepherds, gardeners, agricultural labourers, and so forth, must be relatively more numerous than in a city; and thus we need not be surprised to find 65,000 of these in Lancashire, against 14,000 in the metropolis. And, considering the wonderful shipping activity of Liverpool, and the numerous canals which traverse Lancashire in every direction, we may be prepared to expect that the shipping and the marine is a more numerous class in the numbers of persons connected with ships, boats, and barges in various capacities; in the metropolis, this number is about 21,000, in Lancashire 18,000—very nearly, indeed, in the ratio of 100 to 85. But it is in textile manufactures, and also in mining, that Lancashire most readily takes the lead before London. In Lancashire there are 104,000 persons (out of about 540,000) engaged in various departments of the cotton manufacture, against a few hundreds in London; 7000 in woolen manufactures, against a few hundreds; 21,000 coal miners and labourers, against 5000; 4000 quarrymen, against 500.

Here it must be borne in mind, that the numbers in the preceding paragraph are of males only, and males too who have reached their 20th year or upwards. A few parallel entries will suffice, relating to certain occupations for adult females: of domestic servants and nurses there are, 132,000 in London, and 55,000 in Lancashire; of silk-workers, 8000 in London, and 12,000 in Lancashire; of cotton-workers, 1000 in London, and 50,000 in Lancashire. Here we find that one-sixth of all the adult females in London are domestic servants or nurses, and that one-sixth of all the adult females in Lancashire are engaged in the cotton manufacture.

There are also striking differences in respect to juvenile labour:—The metropolis contains 474,013 males, and 493,260 females, under 20 years of age; the numbers in Lancashire are 489,749 and 474,735 respectively. Now in the metropolis, Whitechapel and Poplar are the places where not only in their domestic or family relations, without connection with any particular employments, there remain about 200,000 who are considered to have some occupation or other; whereas in Lancashire there are 270,000 having employment; and out of this number about 120,000 are employed in the cotton manufacture alone—that is, 120,000 young persons.

In the metropolis, on the other hand, young seamstresses and young domestic servants chiefly fill the list.

We have seen London had 5,223,226 inhabitants, there are, in round numbers, 630,000 men, 760,000 women, and 970,000 persons of both sexes under 20 years of age. Of this latter number, nearly 300,000 are under 5 years of age, and therefore almost equally divided between males and females. In order to show, then, how far male employment are to be met with in London for young persons, we give the following table in relation to a few occupations:—

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Under 20</th>
<th>20 and upwards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Law clerks</td>
<td>1,430</td>
<td>4,401</td>
</tr>
<tr>
<td>Teachers</td>
<td>1,047</td>
<td>3,437</td>
</tr>
<tr>
<td>Messenger and porters</td>
<td>19,743</td>
<td>13,741</td>
</tr>
<tr>
<td>Printers, &amp;c.</td>
<td>3,518</td>
<td>13,306</td>
</tr>
<tr>
<td>Silk manufacturers</td>
<td>1,145</td>
<td>5,529</td>
</tr>
<tr>
<td>Cabinet-makers</td>
<td>2,561</td>
<td>13,953</td>
</tr>
<tr>
<td>Gold and silver work</td>
<td>1,145</td>
<td>6,419</td>
</tr>
<tr>
<td>Brass work</td>
<td>1,062</td>
<td>5,528</td>
</tr>
<tr>
<td>Iron work</td>
<td>770</td>
<td>5,901</td>
</tr>
<tr>
<td>Building trades</td>
<td>6,981</td>
<td>39,843</td>
</tr>
</tbody>
</table>

It is probable that the greater part of the above young persons are apprentices, although the returns do not specify this fact in words. The 19,743 young messengers and porters are evidently the "errand boys," rather a formidable body in London. Taking female occupations instead of male, we thus notice the prevalence of age in a similar manner, we find the following:

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Under 20</th>
<th>20 and upwards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>1,514</td>
<td>11,185</td>
</tr>
<tr>
<td>Servants</td>
<td>46,324</td>
<td>136,292</td>
</tr>
<tr>
<td>Needlewomen</td>
<td>4,998</td>
<td>11,184</td>
</tr>
<tr>
<td>Silk-workers</td>
<td>2,375</td>
<td>8,847</td>
</tr>
<tr>
<td>Paper-workers</td>
<td>625</td>
<td>1,123</td>
</tr>
</tbody>
</table>

If we were to name the three most characteristic kinds of occupations in London for males under 20 years of age, therefore, they would be apprentices to mechanical trades, errand boys, and junior clerks; and for females under 20 years of age, they would be servants, needlewomen, and teachers.

The 36 districts of London exhibit many remarkable groupings in reference to employment. It is well known that the members of a particular trade are wont, in many cases, to congregate near each other; but the Census tables show this more exactly. Lawyers live in Kennington district in greater relative numbers than in any other district—a fact for which there is a very good reason. The population of London is, in the ratio of 100 to 85, but the number of lawyers is, in the ratio of 100 to 26. This is because not only are there more lawyers in London, but there is a very much larger number of the higher learned professions. The same results are shown in other districts. In Kennington, there are more lawyers than in any other district. It is true that in the districts of St. George's Hanover Square, St. James's Westminster, Marylebone, and Kennington, the lawyers are the chief districts. Domestic servants are found in greatest relative force in the districts of St. George's Hanover Square, St. James's Westminster, Marylebone, and Kennington—indeed overwhelmingly so. The tailors are strong in St. James's, Marylebone, and St. Pancras; but relatively more in the Whitechapel and neighbouring districts, where much of the slop work is done. The chief districts for shoemakers are St. Pancras and Marylebone in the north, Lambeth and Newington in the south, Whitechapel and Bethnal Green in the east. The gardeners have Kennington and Wandsworth as their chief districts. Beyond all other districts, the City is the locality for publishers and book-sellers, for it contains the regions of Paternoster Row, and the numberless courts around Fleet Street. Musical instrument makers congregate in decided preponderance in St. Paul's. There are two districts in which watchmakers appear in surprising force; these are, as may be supposed, Clerkenwell and St. Luke's.Coach-makers in Pimlico and Marylebone; shipbuilders in Brixton and Poplar; dyers and calenders in Shoreditch and Bethnal Green (where the silk manufacture is carried on); leather workers in Bermondsey (nearly as many as in all the other 35 districts combined); sugar refiners, nearly all in St. Sepulchre, Whitechapel, and Limehouse; cabinet makers, furnitur makers, Pancras, and especially Shoreditch; cooper's, in the districts nearest the various docks; rope and sail makers, Stepney and Bethnal Green; workers in gold, silver, and precious stones, Clerkenwell—these are the chief associations between occupations and districts.

And so, in like manner, are there certain occupations for...
adult females, which seem to be carried on in some districts rather than others. Domestic servants and governesses are, relatively to the male, most numerous in the districts of Keestington, Marylebone, and St. George's in Hanover Square; while schoolmistresses, as distinguished from governesses, are relatively as numerous in other districts. The char-
women are especially numerous in Marylebone. Those who assist in the shops are chiefly employed in Southwark and Bermondsey, where most of the hat factories are situated. The women tailors, who make waistcoats and cheap goods for the shop shops, are chiefly in the three
examples towns, Whitechapel, and St. George's in the East. The milliners, as distinguished from seamstresses, are in greatest number in Marylebone and Pancras; but the seamstresses, who are understood to occupy a lower grade among needlewomen, are in strongest force in Spieyey and St. George's in the East. These and the tailors in the Marylebone
chiefly. The washerwomen and manglers take up their abode chiefly in the genteel districts. The women who work at shoemaking live principally in Shoreditch and Bethnal Green; while the umbrella makers are rather to be found in Whitechapel and St. George's in the East. The hawker and pedlars are chiefly in the four districts just named. Artificial flower-makers in St. Pancras; silk workers in Bethnal Green; upholsterers in Marylebone; lace workers in the same district—are other examples of predominance.
For reasons already sufficiently indicated, it will be impossible to give abstracts of the county and district tables here; so numerous are they, and to so great a length is the classification extended. But we are able to select a few examples sufficient to illustrate broad general principles of industrial distribution. For instance, every one knows that certain towns have become celebrated for certain manu-
factures; Sheffield for cutlery, Birmingham for small metal works, Manchester for cotton, Leicester and Notting-
ham for hosiery, Leeds for woollens, Bradford for stuffs, and so on; but it may be useful and instructive to know more exactly the extent to which this localisation is carried. Again, certain districts containing no very
large towns, but in which some particular manufactures are nevertheless carried on to a remarkable extent; such as straw-plait, pillow-lace, needles, and many others.
Passing in review the principal cities, boroughs, and towns, we can readily determine from the tables, even without the aid of any previous knowledge on the subject, the prev-
malling character of the industry in each town, and to some extent the degree in which female labour and juvenile
labour are made use of. Let us take a few of the towns in succession.

Birmingham.—Here the males under 20 years of age are 52,640, and above 30 years 61,276; the females under 20 are 33,380; above 30 years 55,545; so placing the numbers in a compact table, we have the result thus:

<table>
<thead>
<tr>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>52,640</td>
<td>33,380</td>
<td>85,020</td>
</tr>
<tr>
<td>61,276</td>
<td>55,545</td>
<td>116,821</td>
</tr>
</tbody>
</table>

116,821 + 118,293 = 235,141 total population.

Now in respect to their population, we find that out of the various classes of occupations, classes 11 and 14 are those in which the Birmingham inhabitants are chiefly employed—viz., working in metal. 1800 men making guns, 1200 making machines and tools, 2400 working in gold and silver, 3000 brass founders, 1400 button makers, 1800 wheelwrights, and 1200 iron founders and makers. These are among the men of 50 years and upwards; but of the males under this age there are no less than 7000 employed in the few metal trades above enumerated. In Birmingham, females are largely employed in the smaller kind of metal manufactures; example—1200 young females, and 1,800 adult females in making buttons; and 300 and 1,800 in miscellaneous iron and steel works.

Birmingham—cont. In these cotton towns are

<table>
<thead>
<tr>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>86,551</td>
<td>89,043</td>
<td>175,594</td>
</tr>
<tr>
<td>104,966</td>
<td>120,821</td>
<td>225,787</td>
</tr>
</tbody>
</table>

191,457 + 208,864 = 400,321 total population.

These are within the Parliamentary limits, which exceed

the municipal. Now passing over the tailors and shoe-
makers, the carpenters and painters, the bakers and butchers, who in all these towns must necessarily form a considerable part of the population, we turn to class 13 as likely to exhibit remarkable characteristics of the workers in Manchester and Salford. Here one single entry, cotton manufacture, com-
prises employed numbers—12,107 men, 9052 boys, 14,503 women, 9051 girls making total of 47,333, in which the females exceed the males by 22,554 against 18,949. Put-
ting the whole of the textile manufactures together—relating to cotton, flax, silk, and wool, they appear to employ about 32,000 men, 13,800 boys, 20,000 women, and 19,000 girls, exhibiting the remarkably near equality of 33,000 males to 32,000 females—more than a quarter of the total population of Manchester and Salford employed in making the textile ma-
ferials for drays, besides 12,000 tailors and seamstresses em-
ployed, would make the total in this branch of the work about 1,700. We have in this paragraph, for brevity, applied the terms boys and girls to young persons under 20 years of age; and shall do so in those which follow.

Nottingham.—Here we enter a bobbin-net and cotton
stocking town—

<table>
<thead>
<tr>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>11,728</td>
<td>15,746</td>
<td>24,228</td>
</tr>
<tr>
<td>14,093</td>
<td>16,074</td>
<td>30,879</td>
</tr>
</tbody>
</table>

26,587 + 30,829 = 57,407 total population.

Of course the numbers in any particular occupations here will appear much smaller than in Manchester, because the population is only one-seventh as large; but the following entries are well worthy of note—stocking-makers, 3,469 men, 412 boys, 1,068 women, 474 girls, making nearly 6,000 in all; boot and shoe manufacturers, 1,245 men, 264 boys, 977

wants women, 1,902 girls, exhibiting a still more striking total of

more than 7,000 persons. Of the aggregate 12,000, more than 7,000 are females. It is worthy of notice that the hose and lace workers bear a larger ratio to the population of Nottingham, than the whole of the textile workers bear to the population of Manchester.

Manchester.—We quit hosiery and lace, to turn to iron and coal —

<table>
<thead>
<tr>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>14,357</td>
<td>13,622</td>
<td>27,979</td>
</tr>
<tr>
<td>19,580</td>
<td>15,443</td>
<td>35,023</td>
</tr>
</tbody>
</table>

34,007 + 29,071 = 63,078 total population.

Now in this remarkable town we glance over the classes of occupation, one after another, without meeting with any numbers so large as to arrest the attention. At last, however, in class 14, we encounter them in surprising force. There are 25,000 miners, comprising 'coal miners, 17,071 boys, and 4,303 men; and among iron works, 3,902 men, and 6,916 women; making a total of about 15,000 workers in these two minerals alone; these, with 700 or 800 females similarly employed, comprise a quarter of the entire population. Con-

siderably more than half the adult male population of

Meryth Tydvil are workers in iron and coal, employed chiefly in the four great establishments of Dowlands, Cyfarthfa, Pen-y-darren, and Plymouth works.

Bradford.—This busy Yorks town introduces us to a wholely different class of manufactures. The parliamentary

borough is somewhat extensive, and includes some of the neighbooring villages, comprising a population of—

<table>
<thead>
<tr>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>22,034</td>
<td>24,359</td>
<td>46,393</td>
</tr>
<tr>
<td>27,062</td>
<td>29,413</td>
<td>56,475</td>
</tr>
</tbody>
</table>

49,096 + 53,912 = 103,008 total population.

After making allowance for the large number of tailors, shoemakers, carpenters, masons, and similar handicraftsmen for supplying the wants of so large a population, we find that class 13 contains the employments characteristic of Bradford, who is so well extended, under the cotton

manufacture, 5351 boys, 10,759 men, 7936 girls, and 6780 women—4,000 of the whole population employed in worsted and stuff manufacture alone. The woollen cloth, the silk, and the cotton manufactures, occupy perhaps 1000 altogether, showing how insignificant they are at Bradford.
which certainly appears surprisingly large. Aberdeen is also engaged in these trades, but in a very much smaller ratio than Dundee.

These few examples would perhaps suffice to illustrate the distribution of particular branches of manufacture in the principal towns; but, adopting a still more compressed form, we will give a few additional instances in the following way:

At Portmouth, out of about 35,000 men and boys in the borough, about 9000 are in the public service, and receive pay from the community; while there are about 2000 privately employed as seamen or as shipwrights. At Leicester, out of 20,000 males and females, about 10,000 are engaged in worsted stockings, and similar articles. At Northampton, out of 13,000 men and boys, more than 4000 are employed in making boots and shoes, the staple industry of the place; and at Stoke-on-Trent, boys similarly employed are in the ratio of one to four of the whole population. At Worcester, out of 16,000 women and girls, 2133 are employed in making gloves. Of the 25,705 men and boys in Wolverhampton, about 7300 are employed upon metals or upon coal; no less than 14,000 make locks alone. In Dudley the ratio is about as high, about 6000 out of 19,093.

Covenry is remarkable for two trades, about as diverse as any two can be, ribbon-making and watch-making: out of a population of 56,121, nearly 10,000 persons (of whom 6000 males and 4200 females) are engaged in silk and wool manufactures, and we have 1700 men and boys who are making watches. At Stockport, 17,000 persons are employed in cotton manufactures, out of a total population of 53,535—nearly one in three; at Blackburn, 6000 out of one in three; at Bolton, 14,000 out of 61,171; at Oldham, 20,000 out of 73,207; at Preston, 18,000 out of 69,542. Thus, in these five cotton spinning and weaving towns, containing an aggregate of about 380,000 inhabitants, about 34,000 males and 42,000 females are engaged in many more than one-fourth of the inhabitants—employed in making and weaving cotton, and in cotton manufacture; and these numbers are out of 31,000 inhabitants, nearly 9000 are employed in various kinds of textile manufacture, of which the principal is woollen.
shire we almost entirely lose the lace-trade; but the straw-plait employs about 9000 females out of 87,497. In Cambridgeshire there is a little done in these two trades, but only 2660 females are employed. In Worcestershire, on the other hand, the females out of 30,295 engaged in the lace-trade. In these two departments of cottage industry, the females employed are of all ages from 0 to 90, chiefly between 10 and 30.

Worcestershire, for instance, in the manufacture of black and white worsted, is not in the direct manufacture. It is principally a forest of the needle manufacture. At Redditch in this county nearly all the inhabitants are supported, directly or indirectly, by this manufacture; although the steel for making the needles, and all the coal for heating the stoves and engines, must be bought from other quarters.

Cornwall is rich in metals, but has no coals. It has 172,193 males in the (registration) county. Among these are 3000 seamen and 2800 fishermen; but when we come to class 14, mineral working, we find about 16,000 copper-miners below 10 years of age, and about 6000 employed in other ways on metals and minerals; none, however, in coals. There are also about 6000 females engaged at the 'above-ground' works of the copper and tin mines.

Let us contrast this with a county containing much coal but little metal. Durham (registration) county contains 207,088 males, and 204,681 females, a departure from the general rule; for here we find more males than females. New Durham was a county of boys and girls and navigation; a very large number out of such a population, and evidently due principally to the navigation of colliery vessels. The number of 4600 ship and boat builders is also large, and points to the small trade of Sunderland. But a much larger number is engaged in coal-mining and working, about one-seventh of the male population. In Northumberland, as might be expected, a somewhat parallel state of things presents itself. There are here 148,016 males; and, of these, about 6000 are engaged in navigating ships and boats, 1400 in building ships and boats, and 11,000 coal-miners; the parallelism, it will be observed, is in the nature of the prevalent occupation, and not in their extent, for Durham greatly takes the lead in this respect; Northumberland is more a county of forgers than of navigators, as being upwards of 50 years of age; but it is satisfactory to find that, consequent on recent legislation, scarcely any boys under 10 years of age, or females of any age, are included among the coal-miners or labourers.

There are two counties in the western part of the kingdom which we may similarly notice, in respect to the manufactures, but still more decidedly to coal-mining. These are Monmouthshire and Glamorganshire. Monmouthshire has sources and springs and mining—there is, for example, in a mining county, of the males outnumbering the females. The iron trades occupy 12,000 males, and the coal trade also 12,000—in round numbers: together more than 24,000 males are engaged. Females are not much employed in these trades in this country. Only Glamorganshire, containing the remarkable towns of Merthyr and Aberdare and their vicinity, has a population of 126,057 males and 115,600 females. Of these males, no less a number than 16,500 are engaged in the coal trade, and 14,000 in the iron trades. In another Welsh county, Caernarvon, copper manufactures are, in respect to the population, if not as remarkable as iron manufactures in Glamorganshire, at least worthy of note as the staple industry of portions of the county. The explanation of this is, that nearly all the copper ores of Cornwall and Devon are sold on the spot to copper-smelters, who have their works at Swansea or Neath, or some other town in Caernarvonshire. Besides the copper workers there are, among the 126,057 males in this county, 14,000 workers in iron, and 15,000 coal-workers.

Something has been said, in former paragraphs, of the remarkable distribution of employments in the cotton and woollen towns of the north; and a comparison, in relation to certain items, both of the trade between Lancashire and Yorkshire and this capital, will be attempted hereafter. In Lancashire, out of 1,005,824 males of all ages, there are about 160,000 engaged in various departments of wool and worsted manufactures; and out of 673,159 females, about 80,000 similarly engaged; and of this total of 240,000, about 17,600 are under 10 years of age. In the West Riding, out of about 87,497 males, not less than 118,000 are under 20 years of age. In the West Riding of Yorkshire, out of 666,918 males of all ages, there are about 120,000 engaged in various departments of wool and worsted manufactures; and out of 763,159 females, about 50,000 similarly engaged; and of this total of 220,000, about 8000 are under 10 years of age. From the above numbers, we observe the following results:—that the male workers in wool bear a larger ratio to the whole male population in the West Riding, than the male workers in Lancashire; and that the number of females engaged in cotton manufactures, about 1 in 6 of the West Riding population is engaged in the wool manufacture.

Such are a few of the most striking results obtained by the Census of 1851, relating to the occupations of the people. There are, however, a few words in conclusion, for any person who desires to know something more of the condition of the people, in this hard-working country, than can be derived from vague generalizations and partial inquiries.

OCEANIA, a name given by Buffon and other French geographers to a fifth division of the earth. They make it extend from about 35° E. to 105° W. long.; the northern boundary being the Indian Ocean, Malacca Strait, the Chinese Sea, and the Pacific along the parallel of 33° N.; the southern one from the strait of Magellan to the extremity of Tierra del Fuego.

A name is thus made to comprise the Andaman Islands, all the islands of the Indian Archipelago, Sumatra, Java, Borneo, Celebes, the Moluccas, the Philippines, Formosa, Australia, New Guinea, New Zealand, and the waters of the Pacific within the limits above stated to the islets of Sala-y-Gomez, the most eastern of the whole.

O’CONNELL, DANIEL, the eldest son of Morgan O’Connell, was born at his father’s residence near Cahir, county Tipperary, Ireland, August 6, 1775. The family of O’Connell, or O’Connell, is of antiquity in the south of Ireland, but the circumstances of the father of Daniel O’Connell were much straitened. Still he did not neglect the education of his son, and his instead of his means, for he sent him at an early age to a "poor old hedge-schoolmaster," named David Mahoney, who first taught the Irish agitator his letters. At the age of thirteen Daniel O’Connell was removed to a school at Redington, near Croy, county Cork, kept by the Rev. Mr. Harrington, a Roman Catholic priest; this school is said to have been the first publicly opened in Ireland after the repeal of the penalizing laws which made it penal for a Roman Catholic to educate his children. In 1790 Daniel, then a schoolboy of fifteen, was awarded a prize by the Lord Chancellor for an essay on the principle of intention of being sent to Lodge; but on reaching that place he was found to be too old for admission, and accordingly was entered at St. Omer’s. There he remained till 1793, when he was transferred for a time to the English college of the Blue Coat School in London, and thence was sent to St. Omer’s, he rose speedily to the head of the college; and so arrested the attention of the then president, Dr. Stapyton, that he persuaded him that he would hereafter make a remarkable figure in the world. The first outbreak of the French revolution scattered the scholars of the Roman Catholic colleges at Donaj and St. Omer’s. Daniel O’Connell succeeded in reaching Calais safely, and, embarking on board the English packet-boat, he landed on the shores of England, "half a Tory at heart"—so deep and keen was the impression left upon his mind by the excesses of the revolution in France.

The legal profession having been recently thrown open to members of his faith, he in 1794 entered himself at Lincoln’s Inn; and four years afterwards was called to the bar, having taken no ordinary pains to qualify himself. His first public speech was against the proposed union between the English and Irish legislatures. It was delivered at a meeting of the Roman Catholics of Dublin, assembled at the Royal Exchange in that city, for the purpose of petitioning against that measure; but the meeting was broken up by the intervention of the military. In 1802 Mr. O’Connell, while he was an active member of the House of Commons, was married privately to his cousin Mary, the daughter of Dr. O’Connell of Tralee. The calamitous occurrences however connected with the Irish outbreak of 1803, known by the name of Emmet’s rebellion, found Mr. O’Connell already in possession of a moderate practice. He had been becoming gradually absorbed in the arena of political con-
tention. Emmet’s trial was the starting point of a new era in the history of Irish agitation: the cruelty inflicted by the citizen-soldier made an impression as deep and lasting as it was general, and the ‘Catholic Question,’ as it was called, rose daily in importance. From this time forward Mr. O’Connell took the leading part in the prosecution of the Roman Catholic cause, and in the 14th of November, 1828, he writes to the late Lord Shrewshury, ‘before the passing of the Emancipation Bill, the burden of the cause was thrown upon me. I had to arrange the meetings, to prepare resolution after resolution for the, consideration of the House of Commons, in the case of each person complaining of practical grievances, to remove the torpid, to animate the lukewarm, to control the violent and inflammatory, to avoid the shools and breakers of the law, to guard against multiplied treachery, and at all times to be ready to meet the real or fancied enemies of the cause.’ Day and night he devoted himself with surprising energy to the work, without receiving pay or fees. In 1804 the ‘Catholic Board’ was dissolved by a proclamation from government, but it was immediately revived under the name of the ‘Catholic Committee.’ It met in the Exhibition House in William-street, and its debates were reported from January 1805.

In 1818 Mr. O’Connell fought a duel with Mr. J. A’Estre, and was severely wounded in the leg. He afterwards, in consequence of the effects of the wound, fell into an aggravation and exacerbated state, and inflicted on his adversary a wound which ultimately proved fatal: it is but just to add that for this result he over-wardsfelt and expressed the most painful remorse. Mr. O’Connell’s public life henceforth offers very little material for comment, and the year 1832, which was the period of the Roman Catholic Emancipation Bill being carried. In the summer of 1828, when the fever and excitement on the subject then in suspense was at its height, Mr. O’Connell and his friends judged that the time was come for bringing the question to a final decision. In the June of that year a vacancy occurred in the representation of Clare county, and Mr. O’Connell, though a Roman Catholic, was proposed as a candidate against Mr. (afterwards Lord) Fitzgerald. He was returned victorious by a large majority, and when the Westminster seats were taken his seat in St. Stephen’s. As a Roman Catholic, he of course refused to take the oaths drawn expressly against the doctrines of the Roman Catholic Church. Discussions in the house, and arguments at the bar, ensued; and though the session closed without any practical result, yet the agitation in Ireland began to assume a formidable appearance, and to threaten another outbreak. Alarmed at the probable consequences of further opposition to claims which a large majority of educated men regarded as just, the Duke of Wellington and Sir Robert Peel gave way, and early in the following year brought into parliament a bill for the repeal of the last civil disabilities under which the Roman Catholic Church and the Roman Catholic population were classed and took his seat as member of parliament in May 1829. In the following year, at the general election occasioned upon the death of George IV, Mr. O’Connell exchanged the representation of Clare for that of his native county, and returned with a majority of several thousand, which was unassailed and unshaken. He represented Dublin from 1822 to June 1835, when he was unseated on petition, but was immedi-ately afterwards returned for Kilkenny. In 1837 he was once more returned for Dublin, and in 1841 for the county of Cork. To carry on more effectively the agitation, Mr. O’Connell had relinquished his professional practice and as a compensation for his loss of income, an annual subscription was organised, which afterwards came to be known as the ‘Rent.’

The year 1843 witnessed the return of Sir R. Peel and the Conservative party to power, and this was the signal for renewed agitation in Ireland. In the following year, Mr. O’Connell commenced his movement in favour of a repeal of the Union, which met with general sympathy from the vio- lence of the movement, and the ignorance of his professed and an annual subscription was organised, which afterwards came to be known as the ‘Rent.’

In 1843 monster meetings were collected on the royal hill of Tara, on the Curragh of Kildare, the rath of Mullaghmast, and other localities renowned in tradition and song. A monster meeting announced as to be held on Connaught, and the ignorantibus his profession and an annual subscription was organised, which afterwards came to be known as the ‘Rent.’

Mr. O’Connell was convicted of sedition, sentenced to be imprisoned for a period of twelve years, his property was seized, and an appeal was made to the House of Lords; but the prosecution answered its intended end; the prestige

and magic influence of the poet ‘Liberator,’ as he was called, was destroyed; he himself henceforth spoke in more measured language, and the funds of the Repeal Association were nearly exhausted in the contest.

The return of the Whigs to power in 1846, and the ad-herence which Mr. O’Connell gave to their party, introduced a new era in the career of the great leader and his friends and supporters, over whom for forty years he had exercised an all-powerful influence. His health began to fail, and he became sorely by opposition, as well as depressed in spirits, at the early appearance of famine in Ireland. Early in 1847 he went abroad with the intention of spending some months in Italy, and of paying a devotional visit to Rome. He had not however proceeded further on his way than Genoa, when he suddenly sunk and expired on the 10th of May. He was the author of a hundred and thirty-five political pieces, compliance with his last wishes; and his body was conveyed to Ireland for interment. Besides three daughters, Mr. O’Connell left four sons, all of whom at one time or other have had seats in Parliament. His eldest son Maurice, many years M.P. for Tralee, died in 1853; and his second son, John, after representing several Irish constituencies, was appointed in 1856 to the Clerkship of the Hanaper Office in Dublin.

Life and Times of Daniel O’Connell, by his son, John O’Connell}

OCTODON. [MURDUA.]

OCTOPUS. [PAPA NAUTILUS.]

ODIHAM. [HISLAUR.] ODIHE, ADAM.
of its tone, and raised his name very high in the list of the living Danish poets, if it did not place him at their head. He used often to say afterwards that in writing ‘Aladin’ he had discovered his own ‘wonderful lamp,’ the vein of poetry which was to give him fame and fortune. He received in 1806 for this poem a travel stipend from the Danish government, and walked into Copenhagen, where he was at the charge of his board. Young Adam soon began to write not only verses but even plays, which were acted by himself, his sister, and some play-fellows, on Sundays, in one of the rooms of the Royal Danish Academy, which was a sort of rehearsal school to which the boy had been admitted, laughed at his attempts; and Dichmann, another Norwegian, who was one of the masters, told him, to his great mortification, that he was no genius—he would never become another Edward Storm, the latter having received the same academy fellowship to qualify him for a mercantile life; but when he left the school at the age of sixteen, he was glad of an accident which prevented his being placed in a conning-house, and readily persuaded his indolent father, who was in much better circumstances than he had been, to allow him to study. In a year however he was tired of Greek and Latin, and having for some months spent all his spare time and money at the theatre, was seized with a desire to appear on the stage. These ideas naturally fitted him in a self-conscious light in a foreign city than in an English one, and at Copenhagen the management of the drama was treated with unusual solemnity. In Rahbek’s Lectures on the Drama, dedicated to the stage, the stage is regarded as a mechanism, the engine hardly secondary in importance, at least. With the exception of the comedies of Holberg, the Danish Molière [Haukao], the plays that were performed were then chiefly translations. Of English pieces, says Oehlenschläger, ‘Mr. Scudéry’s and Mrs. Glavon’s’; of which Rosing was an excellent Sir Joseph [Joseph Surfaec], and ‘She Stoops to Conquer,’ in which Gielstrup was an in-comparable Tony Lumpkin.” He soon found however that he was not likely to rise to a much higher position than that of a walking gentleman, and the acquaintances of two young students, who had taken lodgings with the same landlord as himself, led him into a different line. They were the two brothers Oersted, afterwards so well known. Of the three, the younger, who always occupied for many months, in those obscure lodgings, one, Oehlenschläger, became the greatest poet of Denmark; another, Hans Oersted, became its greatest natural philosopher, and the discoverer of electro-magnetism; the third, Anders Oersted, who married Oehlenschläger’s sister, became its greatest lawyer, and for a time the prime-minister of the kingdom. Oehlenschläger infected the future lawyer with a love of poetry, and the lawyer infected him with a taste for jurisprudence. With the help of his lodgers he relinquished the stage, entered himself at the University of Copenhagen as a student of law, his friend promising his assistance to help him on a little more rapidly than usual. Literature however soon won the victory over law. The university offered in 1809 a prize for a moral or political sonnet. It is a good advantage for Northern literature if the Scandinavian mythology were made use of in it, instead of the Grecian! It was the very idea which was taking possession of Oehlenschläger, and was destined to occupy him for life; but when he drew up an essay he had the mortification to see the prize carried off by another —receiving himself however the honour of being declared the second best.

On the famous 2nd April 1801 when Nelson attacked the Danish fleet at Copenhagen, Oehlenschläger saw the fight at a short distance, from the balcony of the Sea-Cadets’ Academy, and afterwards held the post of ensign in a volunteer regiment of students. He also published a small dramatic piece, “The Second of April,” but it was of no great merit. “That battle,” he wrote, several years afterwards, “inspired the Danes with a taste for poetry, as the battles of Marathon and Salamis did the Greeks, and the destruction of the Spanish Armada the English in the time of Elizabeth.” It is not uncommon, indeed, that a war is required to drive the mean, the petty, and parochial out of a nation’s mind, and bring it in tune for the great and beautiful. In 1803 he issued a volume of poems, containing among other works, the ode of ‘The Eve of Saint John,’ and at once took rank as a writer of some note. The very next year, the tale, of ‘Aladdin,’ which, followed, found its way into the famous story in the ‘Ambian Nights,’ captivated the public, in spite of some very obvious faults, by the general vivacity open only to each other when they did not wish the children to understand them.

Up to the age of twelve, young Adam had been very unfortunate in the article of schools; he was then taken notice of by Edward Storm, a Norwegian poet, who offered to his father a gratuitous admission to a public school in Copenhagen, if his father would accept the charge of his board. Young Adam soon began to write not only verses but even plays, which were acted by himself, his sister, and some play-fellows, on Sundays, in one of the rooms of the Royal Danish Academy, which was a sort of rehearsal school to which the boy had been admitted, laughed at his attempts; and Dichmann, another Norwegian, who was one of the masters, told him, to his great mortification, that he was no genius—he would never become another Edward Storm, the latter having received the same academy fellowship to qualify him for a mercantile life; but when he left the school at the age of sixteen, he was glad of an accident which prevented his being placed in a conning-house, and readily persuaded his indolent father, who was in much better circumstances than he had been, to allow him to study. In a year however he was tired of Greek and Latin, and having for some months spent all his spare time and money at the theatre, was seized with a desire to appear on the stage. These ideas naturally fitted him in a self-conscious light in a foreign city than in an English one, and at Copenhagen the management of the drama was treated with unusual solemnity. In Rahbek’s Lectures on the Drama, dedicated to the stage, the stage is regarded as a mechanism, the engine hardly secondary in importance, at least. With the exception of the comedies of Holberg, the Danish Molière [Haukao], the plays that were performed were then chiefly translations. Of English pieces, says Oehlenschläger, ‘Mr. Scudéry’s and Mrs. Glavon’s’; of which Rosing was an excellent Sir Joseph [Joseph Surfaec], and ‘She Stoops to Conquer,’ in which Gielstrup was an in-comparable Tony Lumpkin.” He soon found however that he was not likely to rise to a much higher position than that of a walking gentleman, and the acquaintances of two young students, who had taken lodgings with the same landlord as himself, led him into a different line. They were the two brothers Oersted, afterwards so well known. Of the three, the younger, who always occupied for many months, in those obscure lodgings, one, Oehlenschläger, became the greatest poet of Denmark; another, Hans Oersted, became its greatest natural philosopher, and the discoverer of electro-magnetism; the third, Anders Oersted, who married Oehlenschläger’s sister, became its greatest lawyer, and for a time the prime-minister of the kingdom. Oehlenschläger infected the future lawyer with a love of poetry, and the lawyer infected him with a taste for jurisprudence. With the help of his lodgers he relinquished the stage, entered himself at the University of Copenhagen as a student of law, his friend promising his assistance to help him on a little more rapidly than usual. Literature however soon won the victory over law. The university offered in 1809 a prize for a moral or political sonnet. It is a good advantage for Northern literature if the Scandinavian mythology were made use of in it, instead of the Grecian! It was the very idea which was taking possession of Oehlenschläger, and was destined to occupy him for life; but when he drew up an essay he had the mortification to see the prize carried off by another —receiving himself however the honour of being declared the second best.
some time in Italy, beginning to feel home sickness, returned to
Denmark after an absence of nearly five years, and read
this production in manuscript to many of the most select
circles, which was followed by his ability in print at the University
in Denmark, in presence of the leading members of the court,
in the queen's apartments. The play, when produced in
Germany, became one of the most popular on the stage, and
had frequently acted for thirty years; and it also became a
favourite in Denmark. A translation of it into English, by
Theodore Martin, published in 1854, has, we believe,
with a general welcome, and all English critics regard
'the Erindringer,' as one of Oehlenschlager's principal titles to
fame.

Oehlenschlager had left Denmark in 1805, an eminent
rising poet. His reputation had risen higher and higher
during every year of his absence, and on his return in 1810 he
was welcomed as a hero. He had at the age of fifteen
engaged the hand of Christiana Heger, the sister of Camma
Rahbek, the wife of Rahbek the theatrical writer, whose
house on the hill (Bakkehus), a short distance outside the
city walls, had been since 1804, and continued till 1830, the
resort of the choicest literary society of Copenhagen. Rahbek
himself had in a fit of vexation just thrown up the post of
professor of esthetics at the university, and Oehlenschlager
obtained it, with the privilege of the king of being absent it
from the university. He has said, however, that he did not neglect to make use of.

Be this as it may, he celebrated his wedding in an unusual
way, but precisely in the style that Rogers, the English poet,
had promised to say would have been, if he had ever
ceded to be a bachelor. 'On the 17th of May, 1810,' says
the Dane's 'Erindringer,' 'I dined with Christiana at her
father's at Copenhagen, afterwards she and I drove our
together to Giffottie, where Pastor Hög, after I had shown
him the necessary papers, went with us to the church and
married us. We got into the vehicle again, man and wife,
and drove off to the beautiful Christianaholm, to Söllya,
which Count Schimmelmann had the kindness to offer us
for the night.' The account of his wedding and of the
notion that his husband had lost much by his dealings with
the booksellers, and under her advice he began to issue his
new plays and poems at his own risk, but soon convinced
himself that he understood nothing of the publishing busi-
ness, and his wife no more; a conviction which he says,
however, that his wife could never be persuaded to share.

During the next five years he wrote a number of plays of
various merit, but none that were equal to those he had
composed at home. He became a member of the literary
feud. Bægge, already mentioned as formerly the head of
the Danish Parnassus, had left Denmark a little before
Oehlenschlager, with the deliberate intention, although
in receipt of a pension from the government, of
never returning to the country, and of never crossing the
line of Danish. He now changed his mind, came back, and,
unable to see with patience the throne of poetry occupied by
another, though one whom he had himself applauded, com-
manded a series of critical onslaughts on Oehlenschlager, in
which the animosities was painfully apparent. The
public became disgusted, Bægge found himself in general
disavour, again expatriated himself, and finally died abroad.
It must however be owned, that Oehlenschlager stood in
need of a little criticism not too intolerant, and that he wrote
better after these attacks than he did at the time they com-
mented. In 1816 he made a second foreign tour to Ger-
many and to France, still using his pen when he halted, but
also driving home by every advantage after a twentyears
A long series of plays and poems followed, among which,
the most conspicuous was 'Nordens Guder,' the 'Gods of the North' (published in 1819), an attempt to combine into one
convenient whole all the scattered legends of the Edda.
This attempt has been pronounced insufficient to fill the
translation of the work into English verse of considerable merit by
W. E. Frye was published at Paris in 1845, and the poet
supplies much of the material for Pigo's 'Manual of North-
ern Mythology.' 'Deutsche Geschichten,' published in 1823,
were written in German, was, on the contrary, of a
unmistakably inferior character. Oehlenschlager, who at the
age of seven-and-thirty took lessons in English from Andersen
Felddborg, a Dane long settled in Edinburgh, and well known
to Willy Scott, entered into correspondence with Sir Walter
Scott to express his warm admiration of his novels; and, on being
encouraged, sent the manuscript of his own novel to England
to be translated by Mr. Gillies, but in spite of the zealous
exortions of Sir Walter, the affair fell through from his
inability to find a publisher. The author disclaimed the
work, and translated it himself. The failure was a
fortunate one for the fame of Oehlenschlager, which would
have suffered much in England from a work so unworthy of
him.

In 1829, when at the age of fifty, he lost his father. "He
was vain of his son," says the poet in the 'Erindringer'
"but, like a sensible father, he never allowed me to see it;
only sometimes I detected the feeling when he had been
indulgent, and reflecting my past conduct, he would talk
with strangers, and particularly with students on the bench
at the hill at Frederiksborg, and lead the conversation
to bear on me; when, if they said anything in my praise, it
shocked them, as he used to think he could not judge incorrulg.
Many good-natured people were of this, and often
afforded this innocent pleasure to the old man.

The death of his father, and the death of Camma Rahbek
and her husband about the same time, threw a gloom over
Oehlenschlager's spirits, and they were soon afterwards
relieved by a singularly pleasant incident. He took for
the first time in his life, in 1829, a trip across the Sound to
the coast of Scania, thinking, as the steamer approached
the Swedish shore, the strangest it was that, though it had always
treated his sign over the other terraces of the hill at Frederiksborg, he had lived half a century, and been to
Rome, without ever passing the straits. A brilliant reception
awaited him from all ranks in Sweden: addresses were pre-
pared for him: the University of Lund sent him a
bachelor. The ceremony of the inauguration of a
rector of the university at the cathedral of Lund in company
with Tegner, the Bishop of Wejxio, who was acknowledged
by all as the first poet of Sweden, and was by many con-
dered to have surpassed in his 'Frithiof' any single work of
Oehlenschlager's. Tegner, in the course of the delivery of a
poetical address in hemistichs, suddenly pronounced the
lines-

'Skilskerna Adam är här, den Norderländske segervolken,
Thernfragen I Diktningens veiri by Thorens & Goebels;'

(The Adam of poets is here, the northern monarch of minstrels,
Host of the poems is here as the poet of the people.)

and in the presence of the crowd that filled the
cathedral, among whom were Oehlenschlager's wife and children,
he was acclaimed a laurel crown on his head, amidst a burst of music and
the roar of cannon. The event, from all its circumstances,
assumed almost a national significance. Tegner and some
other eminent literary men were made honorary citizens of
Copenhagen. A few days after the King of Sweden sent the Order of the
North Star to Oehlenschlager.

Honours continued to shower on him after this; one of
them, the gift of free lodging by the king, seems however to
have been regretted, as he did not like to live in a
house. His own dwelling in Christian VII,' he tells us,"granted me permission to live
for one summer in the house of the castle steward at FREDERIKSBORG, (the house which had been the official residence
of his father). I wished very much to get the permission
extended to more summers than one. When I asked
the king for his kindness, he asked me if there was not a garden
belonging to the house, and if I was not fond of gardening.
This gave me an excellent opportunity of bringing in
my petition. I answered that I should like very much to
garden, and if I could hope to gather some of the fruit afterwards.
The king said that if it was practicable I should have permission
to live there; and I then told him, in the lively tone in
which I like to hear him speak, 'For your Majesty a good
deal is practicable.' He then gave me permission to
keep the house.' Soon after, the poet tells us, he changed it
for a better.

In 1844, on another visit to Paris, Oehlenschlager
was repeatedly invited to court by Louis-Philippe, who
one day, on one occasion to a gentleman, whom he afterwards found
ought to be King Leopold, who told him he had read all his
works in German, and invited him to Brussels. A visit which
he paid to Norway, and another in 1847 to Sweden, were like
the triumphs of the last days of his sixty-seven birth day his play of 'Amleth,' on the same
story as Shakspere's 'Hamlet,' was produced at Copenhagen.
It was completely successful, and the King of Denmark
wrote him a letter to congratulate him on his triumph.
On his seventieth birthday, the 14th of November, 1849, a grand

3 P
festival was given in his honour in the great saloon of the Royal Shooting-Gallery. All the leading poets of Denmark were present, and many of them wrote a song for the occasion. Within a week of the funeral of Oehlenschlager the thanks, in which he alluded to his being near the termination of his career, but said—

'Quod a nobis amicitia
Spinoza,'

and into Orphan, which Shakspere's like closed well, felicity, drama, Walter whom masters a of the representatives were the boy great Flamand's of the of the Great'); Foersan of the of the Scandalous, or

In little more than two months he was destined to be borne along the avenue to which he had thus symbolically alluded. An illness which did not at first seem serious soon became; and about eight o'clock in the evening on Sunday the 20th of January 1850 he felt the approach of death. At half past nine he called to his eldest son and told him, 'At the moment I am going to die I wish them to exalt my own tragedy of 'Socrates.' Read to me now that part of the scene in the fifth act between Socrates and Cebes, in which Socrates speaks of death, is so unapathetically beautiful.'

The son read the passage—

'How then can Death afflict thee?
It can do nothing thee, Cebes,
It must be something or it must be nothing.'

ending with

'Think what a joy then that must be
When the gods themselves to live,—to speak
To Shakspere, with Orpheus and with Homer.
And all the great men who have been before us.'

He heard this passage read with the greatest emotion, looking round him with a smile of pleasure. When it was concluded he put an end to the reading and took leave of his family who were standing around the bed. As the clock struck eleven he expired.

The funeral of Oehlenschlager was a national solemnity, like that of Thorvaldsen a few years before. The funeral procession consisted of about 3000 persons, including repre- sentatives of the queen, the grand hierarchies of the land, the foreign ambassadors, the professors of the university, the clergy of the capital, and all that was most distin-
guished. As it emerged from the western gate of Copenhagen it passed the house in which the deceased was born, and halted while the musical societies executed a solemn 'Prela-
well,' composed for music by Andersen. The procession closed at the church of Frederikskirke, where lies the poet. Grundtvig and Bishop Mynster spoke over the poet's grave. It is the custom in Denmark, his father was organist, and where the body first attended divine service.

The estimation in which Oehlenschlager is held by his countrymen is best shown by the commencement of him in Flamm's 'Galleri af berømmte Danke Mænd og Kvinder.' It is divided into seven parts. The first part is devoted to the great powers in the world of art and poetry, since it has a sculptor to show like Thorvaldsen, whom only the great masters of antiquity can be considered to rival, and a poet like Oehlenschlager, who can worthy take the fourth seat by the side of the three heroes of poetry, Shakspere, Byron, and Götche.

Forsem the translator of Shakspere into Danish sent a copy to Oehlenschlager inscribed 'To William Shakspere's Twin-brother.' The English writer however to whom Oehlenschlager bears by far the most resemblance is Walter Scott. Though the great Shakspere was unfortunate in pure fiction and the great Scottish writer in the drama, the series of the Scotch novels of the one may be most aptly paralleled by the series of Danish tragedies of the other. In both there is an excellence of life, a rare felicity, an apparent ease of production, a wonderful breadth of effect.

Oehlenschlager's tragedies are twenty-four in number, and nineteen are on Scandiavian subjects. They are arranged in the last edition in chronological order, and touch upon almost everything of any great interest or importance in Scandinavian history or tradition. Besides those that have been already mentioned there are—'Krud den Store' ('Our King'), 'The Three Famous Men of Gustavus Adolphus' ('The Varinger in Constantinople'), the hero of which is one of the northern body-guard of the Hungarian monarch, who were taken as a subject after Oehlenschlager by Sir Walter Scott. 'The Wise Man of Mecklenburg,' 'In the Land of the Lost,' 'Landsknecht og Forstvæv,' ('Land Found and Lost'), in which are dramatised the incidents of the early discovery of America by the North-
time the identity of the forces of magnetism and electricity had only been suspected. He now demonstrated that "there is always a magnetic circulation round the electric conductor, and that the electric current, in accordance with a certain law, always exerts a determined and similar impression on the direction of the magnetic needle, even when it does not pass through the needle, but near it." For this discovery he received the Copley medal of the Royal Society of London, and the French Institute presented him with one of its mathematical class prises worth 3000 francs. In 1809 he wrote a "Manual of Mechanical Physics," a second edition of which was published in 1844. The rewriting this work led him to make many original researches in the field of physics, many of which have not been enriched by his experiments. He made many important experiments on the compression of water, and invented an instrument by which liquids might be compressed with more certainty. He was the first to demonstrate the existence of the metallic aluminum in alumina, and made other chemical discoveries. In 1828-29 he again visited Germany and France, and also visited England. On his return to Denmark he founded the Society for the Distribution of the Works of the Learned, through which he set up a body of popular lecturers to deliver courses of instruction in the most important towns of the country. He took an active part in the Scandinavian Society of Naturalists, which, like the Asgrowdian Mathematical Society, assembled annually in different parts of the country. He again visited England in 1846, during the meeting of the British Association at Southampton.

As he increased in years honours increased upon him. He was elected a corresponding member of the Academy of Sciences in the French Institute; and Director of the Polytechnic School at Copenhagen, which he had himself founded. In 1857 he was made Knight of the Legion of Honour; and in 1849 Knight of the Frisian Order of the Golden Fleece. In 1855, the Reward of Merit in the Arts and Sciences. In early life Oersted was associated with the poet Oehlenschläger, whose sister was married to his younger brother, and although devoted to experimental science, he yet took a deep interest in the proposition and development of Danish literature. He was a constant writer for the newspapers and magazines. Acting upon the deep conviction that science should be the handmaid of religion, he did all that lay in his power to make the popular mind of his country acquainted with the facts of natural science. He wrote a lyrical and didactic poem called "The Balloon," which was translated into German. He was also one of the most popular lecturers of his day. He not only lectured in the university to young students, but also delivered courses of lectures on the subjects of public and national interest. A variety of Oersted's papers and lectures of a popular kind have been translated into the English language by the Misses Horner, under the title of "The Soul in Nature, with Supplementary Chapters on Christian Ethics." On the 9th of November 1850 a jubilee was held in honour of the fiftieth anniversary of his services at the University of Copenhagen. On this occasion people of all ranks and opinions assembled round the noble old philosopher. The king of Denmark presented him on the occasion with a country residence at Frederiksborg, near Copenhagen. He lectured through the winter, but the following March he took a severe cold, which terminated in inflammation of the lungs, and on the 27th March 1851 he died. An extraordinary national sketch of Oersted, to which we are indebted for some of the materials of this notice, was published by P. L. Möller, a translation of which is published with the English translation mentioned above.

OERSTEDT. [MINSTERVÆR, S.]

GESTRUS. [Bovs, [Gestrak.]

OFFENCES AND PUNISHMENTS. The punishments under the criminal law had been greatly mitigated previous to 1846. In consequence of this, and perhaps still more, the number of convictions and commitments increased. The metropolis by Sir R. Peel's Act, the 10 Geo. 4, cap. 44, which has been gradually extended to the whole of Great Britain and Ireland, though the number of executions has decreased, has greatly increased the certainty and the definiteness of convictions. In 1831 the number of commitments had been 19,647, of whom 3047 were females. Of these, 13,830 were convicted, and 1,801 sentenced to capital punishments. Of these only 23 were executed, 12 being for murder. Up to 1834 there had been no classification of offences. From that year and subsequently they have been classed under the following heads, from which it will be seen that the increase of offences has been, in England and Scotland, chiefly in offences against property without violence; Class 1, offences against the person; Class 2, offences against property, committed with violence; 3, offences against property, committed without violence; 4, malicious offences against property; 5, forgery and offences against the currency; 6, forgeries against the Revenue; 7, forgeries against the public revenue; 8, forgeries against the post office; 9, forgeries against the Bank of England; 10, forgeries against the Bank of Ireland; 11, forgeries against the established church; 12, forgeries against the librarians. The following is the account of the different classes of offences:

In 1834 there were 20,731 commitments of which 2016 was under class 1, 13,354 under class 2, 15,478 under class 3, 158 under class 4, 308 under class 5, and 1359 under class 6. Of the total 14,729 were convicted, of whom 923 were sentenced to death. Of the total 13,243 were convicted, of whom 21 were for murder. In 1840 there were 27,187 commitments, of which 21,484 were under class 3, and 19,987 convictions; of these 77 were sentenced to capital punishments, 8 of whom were executed, all for murder. In 1845 there were 24,303 commitments, of which 19,006 were under class 3, and 17,409 convictions; of these 49 were sentenced to capital punishments, and 12 executed, all for murder. In 1850, in England there were 26,815 commitments, of which 16,849 were under class 3, 21,353 under class 3, 238 under class 4, 650 under class 5, and 744 under class 6. Of the total there were 20,539 convicted, of whom 49 were sentenced to capital punishment, and 9 executed. There were 31,326 commitments, of which 4903 were under class 3, 2828 under class 4, 763 under class 5, 463 under class 6, 250 under class 5, and 7431 under class 6. Of the total only 17,106 were convicted, of whom 17 were sentenced to capital punishment, and 8 executed. In England and Ireland in 1856, there were 21,437 persons committed for trial, of whom 15,425 were males and 4012 females; of these, 4873 were acquitted or discharged and 31 were found insane; of the number convicted, 1394 were for offences against the persons 1757 for offences against property with violence, 10,468 for offences against property without violence, 94 for malicious offences against property, 767 for forgery and offences against the currency, and 345 for offences not included in the preceding classes and including misdemeanours; 69 were sentenced to death, of whom 16 were executed; 57 were transported for life, and 216 for terms exceeding ten years; 2158 were sentenced to penal imprisonment for terms varying from four years to life, 1,154 were committed to various imprisonment establishments from one month and under to one year, and in this class, in the terms between six months and one month or less, the numbers show a remarkable decrease from previous years; in 1856 the numbers were 7800, against 1854 8400; and 1849 19,647, and the same year was the first in which the lowest was the smallest amount in any year from 1847; 222 were ordered to be detained in reformatory schools, and 127 were whipped, fined, or discharged on sureties. The great decrease in the number of commitments is probably to be attributed in a considerable degree to the extended provisions of the Summary Convictions Acts. On summary proceedings, the number of cases under the Criminal Justice Act, was 11,272, and under the Juvenile Offenders' Act, 2631. Altogether there were 22,428, and 13,923 convicts, of whom 11,408 were for debtors on civil process, and 7537 under the Mutiny Act. The total shows an increase of convictions in 1854 over 1853, and there is a decrease of 7000 in the number of summary convictions. Of the commitments, omitting debtors and military prisoners, which reduce the number to 21,019, there were 1372 in commitments under 21 years of age; 11,901 of persons between 12 and 16; 24,688 for的各种 between 16 and 21; 33,400 between 21 and 30; 20,973 between 30 and 40; 11,343 between 40 and 50; 5519 between 50 and 60; 2732 above 60; and 920 of whom the age was not known. The average number of persons committed, of whom 61,253 could read or write and write imperfectly, 6108 could read and write well, 318 had received superior instruction, and of 8371 the instruction was not ascertained. The county and borough prisons are stated to be constructed to
contain 26,447 prisoners; the daily average of prisoners is 17,764, and the greatest number at one time was 24,055: but, though the number may be room enough, some prisoners are terribly overcrowded.

In Ireland in 1856 the total number of persons committed or held to bail for trial was 7009, of whom 3075 were either acquitted or discharged. Of the number committed, 173 were sent to prison for forgery and against the currency, 556 for offences against property with violence, 2854 for offences against property without violence, 78 for malicious offences against property, 75 for forgery and offences against the currency, and 1143 for other minor offences. Of those committed, 65 were sentenced to death, and 3 only executed; 14 sentenced to transportation for life, and 372 to other periods of transportation or penal servitude; 2798 to various terms of imprisonment; and 982 were whipped or fined, or discharged on parole. Of those not convicted, 55 were outlawed, 7 were found insane, 55 were found guilty, and 179 not proven; the remainder were discharged without trial.

Of the genera of Plants belonging to the order of Fungi, some of the species of which are found upon the human body and others attack plants. It is known by possessing a simple or branched mycelium, which is very minute and pellicular, aggregated into floculent masses softly interwoven and not divided. In the genus Oidea, the mycelium is simple and pellicular, and arises from the joint of the mycelium. O. albicans, the Thrush-Fungus, is found in the mucous membrane of the mouth, fauces, and orophagus of sucking children, and also occasionally in grown-up persons in a state of extreme exhaustion. The nectarium, amidst the discharge of which this fungus is found, are usually called thrush. Although constantly present in this disease the fungus does not appear to produce the disease, but to be the result of an excited condition in the patient. It has been observed that the mucous membrane in this state constantly affords an acid reaction, and this acidity seems necessary to the growth of the fungus. The best account of the disease was founded in the work 'Déploration des Végétaux Parasites.' Several other species of Oidium have been described. The fungus found in connection with the recent grape-vine disease is an Oidium. [Entophyta, &c.]

OIL-PALM. [ELMA.]

OIL-TREE. [BAMBA.]

OILS. The Fixed Oils are mostly products of animal organization, in the fat and adipose tissue; but are found also in plants, generally in the seeds, but in some cases in the fruit, as in the olive. They are composed of carbon, hydrogen, and oxygen, and are liquid or solid according to the manner in which these elements are disposed, most of them consisting of two compounds, a liquid called Olein, and a solid called Stearin, though another solid called Stearin. The Volatile Oils are mostly products of vegetable organization, and are so called on account of the ready manner in which they are volatilized by heat. Plants owe their peculiar odours to these volatile oils. They are divided by chemists into three groups; those which consist of only carbon and hydrogen, as oil of turpentine; those which contain also oxygen, as oil of cloves; and those which contain sulphur, as oil of garlic. [Ova.]

In 1805, a celebrated Swiss naturalist, was born on Offenberg the 2nd of August 1779. He studied medicine and natural history at Göttingen, and held the position of privat-docents in that university. In 1807 he became extraordinary professor of medicine in the university of Jena; then transferred to Göttingen, and was in 1819 professeur ordinaire de philosophie; in 1822, professor of natural history till his death. At the time he began to study natural science, the writings of Kant, Fichte, and Schelling were producing a deep impression on the minds of the students of natural history. Schelling, who had some familiarity with the principles of the transcendental philosophy to the facts of the natural world, and had by a process of thought endeavored to give an explanation to the phenomena of nature. It was in this school that Oken stated his views in the forms and the development of animals. In his classification he took for his basis the presence of the sense, which is the organ of observation of the animal to the environment in which it lives. In his work 'On Generation' he first suggested that all animals are built up of vessels or cells. In 1806 he published his 'Contributions to Comparative Anatomy and Physiology,' and pointed out the origin of the intestines in the nimbilial vessel. In this year he made an excursion to the Harz Mountains, which resulted in an important thought. This may be described in his own language: 'In August 1806,' he says, 'I made a journey over the Harz. I said to myself: Let us perceive in the animal kingdom a likeness to the way of man, and since that time the skull has been regarded as a vertebral column.' This discovery was published in an essay on the 'Signification of the Bones of the Skull.' This essay, although it attracted little attention at first, laid the foundation of those inquiries which, in the hands of Christoph Geyffroy St-Hilaire, and Owen, have led to the establishment of those laws of homology in the vertebrate skeleton that are now a universally received branch of anatomical science. It was by the persevering use of the idea that flashed across his mind, which he had acquired from these writers, that Oken laid the widest possible view of natural science, and classified the mineral, vegetable, and animal kingdoms according to his philosophical views. The transcendental philosophy has never been popular in England, and the transcendentalist views of Oken have been little read in England. The generality of writers on natural history in this country, so that this work has been frequently regarded as the offspring of a diseased imagination rather than the cool decisions of a philosopher. Nevertheless, the author was pleased at its translation, and wrote a preface to the English edition. However little value this work may be as an introduction to modern science, it is interesting as a document in the history of a great mental movement, and contains the germs of those principles which are now regarded as the secure generalisation of well-observed facts.

From the date of the publication of this work to the day of his death, Oken incessantly contributed to the literature of natural history. In the year 1817, he started a natural history journal called 'Annalen der Naturforschung,' which has been continued in this form for thirty years, and which contains a large series of his papers on every department of natural history. Though a transcendentalist in philosophy, he was an energetic and acute observer, and has contributed largely to the individual history of the animal kingdom.

He was greatly respected throughout Germany, and it was at his suggestion that the first meeting of natural philosophers took place in 1822. The German Association which thus was instituted lasted for thirty years, and has assembled in large towns of Germany, whilst every country in Europe has imitated this example with great and increasing success. Oken died full of years and honour, at Zurich, in August 1847. OKENF. [MINERALOGY, &c.]

OILS. The following table and account of the Old Red-Sandstone Formation is given by Professor Ansted in his 'Elementary Geology':—
by this formation; and its vast thickness is well displayed in the cliffs crossed by the new road from Leominster to Hereford. In the northern portion of the range, and near the mouth of the Towy Valley, the limestones are most fully developed, becoming much thicker and almost more crystalline than in other parts.

In Scotland the uppermost beds are highly arenaceous, and often consist of sandstone conglomerates. The intermediate calcareous beds are composed of fossils which have a more regular composition, yielding unequally to the weather, and exhibiting a brocaded aspect. It contains masses of chert exceedingly hard, and these, from the manner in which they are incorporated with the rock, appear to have been of contemporaneous formation. The lower beds consist of firm, calcareous sandstone, with a few grits and flints, and are very persistent, being found both in Moray and in Fifes, localities 120 miles apart.

The middle group of the Old Red-Sandstone of Scotland, corresponding to the Cornstone of England, is developed in Forfarshire, in Morayshire, and in the Grey-Sandstones of Berwickshire, where the lower beds are absent. It is represented as consisting, for the most part, of rocks of a bluish-gray colour, sometimes, as at Dalraddy, resembling the silurian sandstones, at others forming a hard fissile flagstone exported as a paving-stone, and occasionally appearing in beds of friable stratiifed clay, easily washed away by the sea. The colour however throughout is gray, and in this respect differs essentially from the English contemporaneous beds, which are chiefly reddish brown or marly.

The base of the whole system is represented by Mr. Miller as consisting of an extensive and thick conglomerate rising into a loamy mountain-chain in the county of Caithness, and consisting of 2000 feet of conglomerates, and from Huvord's bay, near the island of Lewis, there is a considerable thickness of conglomerates, and from these the Devonian System is derived.

The Devonian Beds appear to be composed of the whole series of the Old Red-Sandstone, the upper beds of which are so much compressed and modified, as to form the rocks of the Carboniferous Series.

The most striking peculiarity of the Devonian System is the great thickness of the rocks, which are composed of sandstone, limestone, and conglomerates, and in many places they reach a thickness of 5000 feet. The most striking peculiarity of the Devonian System is the great thickness of the rocks, which are composed of sandstone, limestone, and conglomerates, and in many places they reach a thickness of 5000 feet. The most striking peculiarity of the Devonian System is the great thickness of the rocks, which are composed of sandstone, limestone, and conglomerates, and in many places they reach a thickness of 5000 feet.
Platycrinus, 2 species.
Cyathoecrinus, 8 species.
Tenuatrascele ovata, Goldf. Phil.
Crustacea.
Bronza fabeliliger, Goldf. Olenus punctatus, Stein.
Calympen sternbergii, Mant. Phacops, 3 species.
Harpes macrochephalus, Goldf.
Conchifera Dinymaria.
Corbulda hannahii, Sow. Mytilus Damonensis, Phil. 9 species.
Oculasella, 3 species.
Cypriocidex, 2 species.
Fossiloderma, 8 species.
Moliola, 9 species.
Conchifera Monomorria.
Avicula, 9 species.
Pecten, 8 species.
Brachiopoda.
Atrypa, 19 species.
Culeolus sandalina. Lam. Productus, 6 species.
Chonetes, 2 species.
Ortho, 18 species.
Gastropoda.
Acrolicus sigmoidalus, Phil. Natica, 2 species.
Buccinum, 4 species.
Euomphalus, 3 species.
Loxonema, 8 species.
Megalodon, 2 species.
Murex harpula, Sow.
Bellerophon, 8 species.
Pterinos, 3 species.
Cephalopoda.
Olympeia, 7 species.
Cyrtoceras, 19 species.
Goniatites, 11 species.
OLDBURG, Worcestershire, a town in the parish of Hales Owen, is situated near the junction of Staffordshire, Shropshire, and Worcestershire, in 52° 30' N. lat., 2° W. long., distant 49 miles N.N.E. from Worcester, and 180 miles N.N.W. from London. The population of the town of Oldbury is given in the Returns of the Census of 1851 as 5114, but this does not include the whole of the town. The entire population in 1851 was 11,691.

The town of Oldbury has had very much increased of late years, owing to the extension of the iron trade. The parochial chapel of Christchurch is a commodious brick edifice with a square tower. There are chapels for Wesleyans, Primitive, and New Connexion Methodists, Baptists, Independents, Christians, and Roman Catholics, and Unitarians; and National, Free, and other schools. Besides numerous iron and coal mines in the vicinity, there are manufactures of iron and steel, locomotive engines, malt-mills, edge-tools, hollow iron ware, bricks, earthen draining tubes, and of alkali. Boat-building is carried on, and there are corn-mills and breweries. Oldbury is nearly surrounded by the Birmingham Canal; the river Tame runs through the town, turning several mills in its course; and the Stour Valley Railway passes close to it. A customary market is held weekly on Saturday. A county court is held in the town.

OLDCASTLE. [Meath.]
OLEANDER. [Nerium, s. l.]
OLEGON SPAR. [Mineralogy, s. l.]
OLEIN. [Tribuc, Orycc, s. l.]
O'LIGOCASE. [Mineralogy, s. l.]
OLEPHINE. [Mineralogy, s. l.]
GILBERTON. [Nottinghamshire.]
OLNEY. [Buckinghamshire.]
OMAGH. [Tyron.]
O'MALUS. [Lampas.]
OMMASPIRITES. A genus of Cuttle-Fishes belonging to the family Teuthida. Body fleshy, firm, cylindrical, elongated, flanked near its posterior extremity by two triangular fins. Locomotive apparatus formed of "conical per-

pendicular pita, each communicating by a narrow groove with a small horizontal pit, surrounded by a prominent margin, the whole of this being more or less raised on the surface of the body, and forming a rather prominent elevation at the base of the locomotive tube; and, besides, of a tubercle prolonged into its upper part into a decreasing nose-shaped crest; and lastly, of little horizontal inferior crests placed on the inner margin of the body." Eyes very large, opening widely exterioy, and provided with a lachrymal sinus; arms 10, like those of Loligo; pen conoress, flexible, elongated, as long as the body, terminating at its lower extremity in a hollow ample cup.

This Cuttle-Fish of this genus closely resembles those belonging to Loligo. Besides the character just given, they may generally be distinguished by the short rhomboidal termination of the body, formed by the fins, combined with the kindred similarity. These species are the most pelagic, and some of them are gregarious. They seem to be distributed all over the world. They are called Flying Squids by Fishermen. (Forbes and Hanley.)

The following species have been taken on the British coasts:

O. sagittata (Sepia Loligo, Linnaeus), with an elongated body; peduncles of tentacular arms without suckers; extremities of their clubs covered with closely set rows of numerous small teeth. This species is frequently found on the British coast, but Moors. Forbes and Hanley record two instances of its recent capture. M. d'Orbigny regards the Loligo Pleioneum, L. Harpago, L. illecebrosa, and L. Coincidenti as found in British seas.

O. todarum (Loligo sagittata, Lam.), Delle Chiaie. It has an elongated body, and the peduncles of the tentacula provided with suckers throughout their length. This squid is often called in British catalogues Loligo sagittata. It is frequently found on the coasts of Great Britain. It has been made the subject of an elaborate memoir on the anatomy of its nervous system by Mr. Albany Hancock.

O. olkana (Ball), has a short body; suckers confined to the club of the tentacles, minute, and 4-ranked at their extremities. It has been found in Dublin Bay, and was first described by Dr. R. Ball of Dublin. (Forbes and Hanley, History of British Mollusca.)

OPHAREA, a genus of Plants belonging to the natural order Euphorbiaceae. The seeds of one of the species are said to be eatable when the embryo is extracted, but if this is not done, they are too caustic for food. On the authority of Mr. W. McLeay, Dr. Lindley says this nut is most delicious and wholesome, and that it is known by the name of Opharee Nut in some parts of America. Other euphorbiaceous seeds have the same properties.

O. triandra is a Guiana plant with a white juice, which turns black on drying, and is then used as ink.

OL. [Geology; Oolite.]

OOLITE. [Geology; Oolite.] At one time it was supposed that the little round masses which are so characteristic of the Oolitic Formation were portions of limestone which had gathered round various forms of minute fossil animals. It was suggested that these organisms were probably Foraminifera. Recent microscopic investigations have however shown that these little round bodies are purely inorganic, and that they are formed in the same manner as the larger nodules of the magnesian limestone.

The oolitic deposits are divided naturally in England into three parts, the Upper Oolite resting on the Kimmeridge Clay, the Middle Oolite representing the Oxford Clay covered by the Coral Rag, while the Lower Oolite is more variously composed of numerous bands of clay, sand, and limestone.

The Upper Oolites, called on the Continent the Portlandian Group, are, so far as the British Islands are concerned, almost entirely confined in their development to the south of England, only that stratum of clay which usually forms the base of the group being exhibited in Yorkshire, in the vale of Pickering.

The group of strata containing the Portland stone, and exhibiting the Portland Island, includes several layers of coarse earthy limestone, which rest on a bed of siliceous sand, mixed with green particles. This is called the Portland Sand, and sometimes attains a thickness of as much as 60 feet in the west of the island, and forms a complete passage into the underlions.

Above the coarse limestones of the lower part, which usually consist of alternate hard and soft layers to a thickness of...
of 50 or 60 feet, there are three beds of serviceable stone, interstratified with clayey or silicious bands. Fossils occur in all these strata; but they are rare in those beds of the stone which are worked to advantage for economical purposes.

In the upper part of the Portland series there occurs a very interesting bed, about a foot in thickness, of a dark-brown sub stance, containing much earthly lignite. This bed, called the Dirt-Bed, seems to be made up of decaying roots, which at some remote period may have been the surface of a ree. A portion of whose stems are now fossilised around it. Wherever the dirt-bed is laid open to extract the subjacent building-stone these remains of trees occur, and they are placed at such distances from one another as trees growing in a modern forest.

It results from the circumstances of this deposit, that the surface of the Portland stone, at the termination of the Oolitic period, must have been for some time dry land, and covered with a forest; and we have a kind of measure even of the duration of this period in the thickness of the dirt-bed, which has accumulated more than a foot of black earth, loaded with the wreck of its former vegetation. "The regular and uniform preservation also of this thin bed, described above, shows that the Ranges from dry land to the state of a fresh-water lake or estuary (which the nature of the overlying rock proves to have success ed the period of dry land) was not accompanied by any violent denudation or rush of water, since in the loose earth, together with the trees which lay prostrate on its surface, must inevitably have been swept away had any such violent cata strophe then taken place."

The Kimmeridge Clay is of a blue, slaty, or greyish-yellow colour, which is a consequence of the quantity of siliceous or crystallised salt of lime. Its usual effervescence with acids, and exhibits in tolerable abundance both vegetable and animal impressions, although its fossils are of a general kind, and less numerous than in the collection. It is a bed of great thickness; horizontal, or nearly so, in its stratification; extremely persistent in its peculiar mineral and fossil characters, but not very extensively developed either in England or on the Continent. The name Kimmeridge Clay, has been applied to its because it is well exhibited at Kimmeridge Bay, and near the village bearing the same name in the Isle of Purbeck.

At this spot there are also found, alternating with the clay, certain beds of highly bituminous shale, occasionally used for fuel, and locally known as the Kimmeridge Coal. There are many beds of lignite found in the Oolites, but these are perhaps the most remarkable, next to those of the lowest Oolitic deposits of Yorkshire and North Antrim.

Among the foreign rocks of this part of the oolitic period are—1st, the Calcaire de Blangy, on the coast of Normandy; 2nd, the upper beds of the Jura, in Switzerland; and 3rd, the Solenhofen beds. The three ranges of the Donets, in Southern Russia, there are beds of Oolitic Limestone of light-yellow colour, which appear to belong to this division of the secondary series. The Middle Oolites consist for the most part of a thick bed of clay, called the Oxford Clay, widely expanded throughout England, and not unlike in the same form on the Continent, and a series of overlying limestones, chiefly remarkable for the abundant remains of coral found in them.

The upper beds of the middle Oolitic Series are partly calcareous and partly sandy, the former consisting chiefly of a very interesting group of corals known under the name of Coral-Rag, and the latter, the sandy beds, or calcarious grits, often more or less intermixed with calcareous matter, and containing thin laminae of clay sometimes passing into irregular Fossils of hard and tough marly rock. This calcarious matter seems entirely due to the presence of crushed and decomposed organic remains.

The Oolitic system embraces also the formation called Lias. In England it consists of a series of strata in which an argillaceous character predominates throughout; it also contains limestone mixed with clay. It seems to form four principal members, which are thus described by Professor Ansted.

"The Upper Lias, or Alum-Shale, is best seen at Whitley, and on the low ground near the Walls of Lincoln, where it is more remarkable in the different parts of England where it is most developed. The dark blackish-grey, united with the singular ribbed-like structure, is more particularly remarkable in the upper beds of the formation, and is well seen by a fine-grained ferrigenous sandstone, slightly oolitic in structure, and containing a few fossils, marking the close of the Middle Oolitic period.

In the north of England the contemporaneous bed is a coarse sandstone, containing corals, but (as at Alum, in Yorkshire), including a considerable portion of fossil remains of shells, both bivalves and invertebrals. The bed never loses its coralline character, and may perhaps represent an imperfect coral reef, once extending from the north-west of England to what is now the right bank of the Humber.

The Oxford Clay is a very important member of the oolitic series, attaining a thickness of not less than 500 feet, and spreading over a great part of England—more especially occupying the fen-districts in the counties of Lincoln, and North-este, which appear to be partly caused by the action of this bed with the Kimmeridge Clay, producing a wide expanse of flat and undrained country. The same deposits are well seen at Weymouth; and they cover an important part of the East Riding of Yorkshire. The stratification throughout is nearly horizontal and undisturbed, being conformable with that of the formations immediately above and below it.

The appearance of the Oxford Clay is that of a stiff pale-brown argillaceous bed, containing a large proportion of calcareous matter, and a more or less abundant mixture of iron pyrites. Numerous organic remains are found in it, which are sometimes developed in the clay itself, but more frequently form a calcareous nodule, about which iron pyrites have aggregated. Those preserved in the clay have been generally found in a very rotten condition.

The Lower Oolites afford considerable ambiguity in the British Islands, but the details seem to be rather local than general interest; and though partially extending to Normandy, are by no means universal in other parts of Europe.

1. The Cornbrash (the uppermost bed) consists of a variable thickness of clays and sandstones, which ultimately pass into a thin rubbly stone, tough and occasionally crystalline.
2. The Forest Marble, which consists of carbonate of lime.
3. The Great Oolite, consisting of a variable series of coarse shelly limestones.
4. The Bradford Clay, consisting of a pale-greenish clay, containing a small proportion of calcareous matter, and including thin slabs of tough brownish limestones.
5. The Great Oolite is separated from the next bed, containing amongst them the clay used in the manu facture of cloth under the name of Fullers' Earth, and also a thin calcarious fragment, known as the Horsefield Slate. The latter is remarkable for containing the remains of Marsupial Animals. [MARSUPIALIA.]
6. The Inferior Oolite is the last of the series of oolitic limestones. It is employed to a great extent as a building material. Its representative in France is the Caen-Limestone.

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at Lyme Regis, Whitley, and Barrow-upon-Soar, in Leicester-shire."

"The principal locality of the middle beds of the Lias is the neighbourhood of Chelltenham, where the marine line of Dumbleton Hill is crowded with interesting organic remains. It is made up of alternating layers of coloured clays and sands, which are occasionally calcareous, and of beds of impure limestone."

"This part of the series is also represented in the north of England, where it has an average thickness of about 130 feet, and consists of sandy shales, of which the upper portions are distinguished by the presence of several bands of agglutinaceous iron nodules.

"Lower Lias Shale.—The great mass of the lower division of the Lias is found in the middle of England, and consists of thick beds of dark-coloured and finely laminated shale, in which are interbedded beds of sandstone and limestone. These form the base of the series, and graduate downwards into a whitish sandstone, belonging to the uppermost beds of the New Red-Sandstone system. The transition is different again in the south of England; and at Lyme Regis marks of a light-blue colour represent the upper beds of the New Red-Sandstone and pass into the Lias Limestone by a succession of dark slaty marls, which are overlaid by a number of gray calcareous beds, these again by other slaty marls of the upper series. The same beds of the Lower Lias Shale are not present in this part of the deposit in their ordinary form.

"The lowest portion of the Liasic System occasionally consists of a very thin bed, in some places entirely made up of fragments of fossil bodies (chiefly the remains of fish), but sometimes it passes into a white micaceous sandstone, still recognisable as the same bed. This bed was first observed under a small patch of Lias, near the town of Ayst (situated on the left bank of the Severn, nearly opposite the mouth of the Wye); but it has since been recognised at Axmouth, in Devonshire, and in other parts of England farther north, having a total range of upwards of 100 miles. It is barely more than 3 or 3 inches in thickness, but invariably occupies the same geological position, and is for the most part as high as a man's head, and remains, that a long period must have been required for its formation. In some parts of the country, and especially in Gloucestershire and Worcestershire, the passage of the Lias into the underlyin beds of New Red-Sandstone is marked by the presence of calcareous flagstones, called Lower Lias Limestones; and these usually alternate with laminated shales, the whole in that case forming together the lowest deposits of Lias.

"On the Continent the Lias is frequently found, and the appendages of plants and animals developed in those middle beds, if not all the calcareous, however are usually more calcareous, and the lower more sandy, and these latter sometimes, as in Belgium, pass insensibly into the upper New Red-Sandstone. The town of Luxemburg is built on a hard sandstone of this kind, and these beds pass into the rock called Arcy, a peculiar and often metallic ferriferous metamorphosed deposit, occurring where the Lias sandstone in contact with crystalline rocks. Fossil have been found in South America, and also in Northern India, attributed to the period we are now considering.

"The Lias is a formation exceedingly rich in fossils; and amongst them are representatives of all the principal natural groups. Corals however are exceedingly rare, and of small size. Encrustations are numerous and abundant, especially the Pentacrinites, which attached itself to floating wood. Radiated animals of other kinds characterise parts of the deposits, and of these the Diadema is an example. Insects and Crustacea have been frequently found. Star-Fishes are common in the latter part of the series.

"Both oval and bivalve shells of various kinds are characteristic either of the whole deposit or of different beds. The Spire is one of the latter species of a genus represented far more abundantly in ancient deposits, while the Pecten and Cardium are among the most abundant representatives of more recent forms. The Pecten is an example of a similar kind; and the Ammonite and Belemnite are eminently characteristic cephalopodous shells, infrequent in the Lias, and which, indeed, always occur in large masses of so specially for a great part of the oolite period. About 70 species of Mollusca have been described from the British localities only, of which as many as 70 are Ammonites.

"The remains are common in some parts of the Lias, and as minute collections in all the others. In the Lias as described, these many resemble the shark, but none seem to have attained very gigantic proportions. This however was not the case with the Reptiles, which during the period in question were equally remarkable for their large size, voracious habits, and incredible abundance. Many species belonging to natural orders of these animals long since lost, were then widely dispersed; and many other species of genera now common in distant parts of the world. The Flying Reptiles is a striking instance of this phenomenon. The British Country and indeed strictly speaking the monsters named Ichthyosaurus and Plesiosaurus, are other examples."
O. punctata (Forbes), Dotted Brittle-Star. This species, first described by Edward Forbes, was found by Henry Goodaur in the stomach of a cod.
O. philomitra, Thread-Rayed Brittle-Star. The rays are very long and siliform. It is a rare species in Great Britain.
O. brachiatia, The Long-Armed Brittle-Star. This also is a rare species.
O. granulata, Granulated Brittle-Star. The rays are covered over with pointed spines.
O. Bellii, Daisy Brittle-Star. It is not uncommon on many parts of our coast, and is to be found under stones at low tide.

O. Goodauri, named after Dr. Gooadaur, who took it from a cod's stomach taken off Anstruther in Fifeshire.
O. roulea, Common Brittle-Star. Disc rounded, convex, covered with spines of various lengths; two large triangular parallel plates opposite the origin of each ray; upper ray-scales triangular, minutely imbricated; lateral plates bearing five spines each, which are much longer than the breadth of the ray. This is the most common of our British-Stars.
O. minuta, Sand Brittle-Star. This is smaller than the last, and is found buried in the sand.

(E. Forbes, A History of British Fishes.)

OphioGLOSSACEAE, Adders Tongues, a natural order of Acrogenous Plants, belonging to the alliance Filicales. They have an erect or pendulous stem, with a cavity in the middle instead of a pith, and two or more leaves, placed round it in a ring; the stalks of the leaves and the stem become blended together below; the leaves have netted veins; the spore-cases are collected into a spike formed out of the sides of the upper leaf, S-shaped, without any trace of an elastic ring; spores resembling fine powder.

These plants are a transition from Ferns to Lycopodiales. The species are most abundant in the islands of tropical Asia. They occur however in the West Indies and in the tropical parts of Africa, at the Cape, and in Tasmania. They are of little or no known use. The following genera with about 25 species belong to this order: Ophiozostis, Ophioloma, Heimioniostachys, Botryodium.

OPHIOPODIUM, [Bot. Syn. 25, 1865.]—OPIANIC ACID. [Chem. 2, 1873.]

OPIANINE. [Chem. 2, 1873.]

OPIANYLE. [Chem. 2, 1873.]

OPIE, AMELIA, the wife of John Opie, was the daughter and only child of Dr. James, an English physician of Norwich, where she was born on November 12, 1769. Her mother, a woman of considerable talent, attended to the care of her daughter's education, but she died in 1774, and the daughter assumed the position of mistress in her father's house, and became his constant companion. Handsome and lively, possessing musical talents, her company was much sought, and she enjoyed society thoroughly, but it did not tend to solidify her mind. Very early in life also she took a fancy to attend the public amusements, which she continued to frequent even at an advanced age. Her father was an admirer of the principles advocated in the early stages of the French revolution. These principles her daughter adopted, and she was present at the trial of Hornelock and his associates for high treason, of which she wrote home an account. In this whirl of social life, law, and politics, she had the judgment to form her friendships among persons distinguished for their virtues and talents, and she gave some of her leisure to literary pursuits, forming letters to D'Orbigny in this class, are now no longer regarded even as Molluscs. [Foraminifera, 2, 1873.]

PIATES. [Fishes, Fossil, p. 1.]

(Armed, Elementary Geology; Tenant, Stratigraphical

Last of British Fossil.)

OphioCEPHALUS (from 40, a snake, and kephal, head, a genus of Fishes belonging to the division of Acanthocephalia, characterized by having labyrinthiform pharyngeals, and capable of living for a long time out of the water. The species inhabit India and China. [Aramas, 1.1.]

OphioCOMA, a genus of Animals belonging to the order Echinodermata, to the family Ophiuridae, and to the tribe Ophuridae. The species are described. Brittle-Stars on account of their fragility. They are very difficult to preserve. Professor E. Forbes recommends their being placed in fresh-water, and then caught, which quickly destroys them; and after they have been in it an hour or so, to dip them rapidly in boiling water. They are then to be dried in the sun, or in a current of air. The following account is a correct one, even in parts of this essay, which was written by Mr. Forbes in his History of British Fishes:—

O. neglectus, Gray Brittle-Star. Disc round, flat, imbricated with small smooth scales; two oblong parallel touching plates opposite the origin of each ray; upper-ray scales square; lateral-ray plates bearing four or five spines each, which are equal in length to the breadth of the ray. This species is not uncommon on all parts of the British coast.

O. Ballii, Ball's Brittle-Star, was first discovered in Ireland by Dr. Ball.
"Tait’s Magazine" in 1831. In 1804 she published the novel of "Adeline de Lorraine; or, Mother and Daughter," in 9 vol., which added considerably to her reputation, and some passages of which are highly pathetic; but still she wanted art in grouping and developing her characters, and in combining her incidents. In 1805 Simple Tales, in 4 vol., were issued, in which she professed the purest and most unequivocal religion. Her feelings and ardence that steals into the heart, and language easy and simple though not always strictly accurate, there is still the same want of logical coherence; the tales want reality. The characters are ill-drawn and often extravagant, yet the "Rutland Coach," in 1806, with one or two productive interest. In 1807 after the death of her husband, she returned to the home of her father. In 1808 she published "The Warrior’s Return and other Poems," and in the following years her productions increased. A memoir prefixed in 1812 appeared "Temper," a tale in which she introduced many of her impressions of France; and in 1813 "Tales of Real Life," which however are not more real than her former tales. In 1816 Valentine’s Eve, a novel in 3 vol., was published, developing some of her religious views, now becoming more decided. In 1818 "Tales of the Heart," and in 1822 "Madeline," neither of them rising above the average of the preceding. Her next work, "Lying," appeared in 1825, and was dedicated to her father; the coast of art tales, made for her avowed purpose, with dissertations, and more decidedly than any the great defect in her reasoning powers, though all evince the most praiseworthy intentions.

Early in life Mrs. Opie had been intimate with the Quaker family of the Frys, particularly with Mrs. Fry, and through them with the Garnets. In 1814 a letter from J. J. Gurney appears to have made much impression on her mind, she committed it to the Quakers and in 1816, with her father’s consent, she formally joined their society. In 1825 her father died, but she continued to make Norwich her abiding place, varied by frequent visits to her friends, to Scotland, and the South of England. She adopted the style and dress of the society she had joined, but did not give up her literary pursuits. She still wrote occasional poems, and in 1828 "Detraction Displayed" was published. In 1829 she visited Paris, and her old political feelings seem to have revived. She wrote some verses on the tricolor, addressed to Lafayette, in which she says that at the sight of it, "I seem to feel youth’s hours return." In 1830, on the expulsion of Charles X, she again went to Paris, and has given a lively account of what she saw. In 1833, "Lays for the Dead," a volume of poems, was published. In 1835 she made a tour to Belgium and Switzerland, of which she gave an account in "Tait’s Magazine," in 1840. She continued active and beneficent for some years, contributing occasionally to periodicals, through personal, or literary, or political, or religious, or other, periods, and after an illness of some duration, she died at Norwich, Dec. 2, 1853. Her Life has been written with much care by an attached friend, Miss L. C. Brightwell, and published in the "Orchid and Broom." The Orange, the Principality of, included the town and neighbourhood of Orange in the south of France. René de Nassau, nephew and successor of Philip de Challon, prince of Orange, was killed at the siege of St. Dizier in 1544, and left his hereditary to his cousin William of Nassau, the founder of the republic of the Dutch United Provinces. After the death of William III, king of England, the principality passed to Frederick, king of Prussia, William’s eldest son, and on his succession, to Frederick-William, ceded it to Louis XIV, at the close of the War of the Hague (1710). The principality then merged in the province of Dauphiné, and is now included in the Department of Vaucluse.

** BANCHE TRIBE. [AUSTRAICIANS; CYTRUS.]

** ORCHIS, a genus of Plants the type of the natural order Orchidaceae, and belonging to the tribe Ophrydinae. The old Linnaean genus Orchis is now divided into many genera [Gynaecorchis, Orchis, etc.]; the large number of species are still retained under this division. An Orchis is distinguished by the pollen masses being divisible into lobes, which are wavy and definite in number. The anthers are wholly adnate. The genus Orchis belongs to a section of the tribe, in which all the petals are of the same size and form a rosette process between their bases. In Orchis the perianth is ringed and banded; the lip 3-lobed, spurred; the glands of the stalks of the pollen-masses are in a common pouch. The following is an arrangement of the British species according to Babington:—

* Glands of the pollen-masses separate; lip erect in sertation.
  + Bracts mostly 1-nerved; root-knobs undivided.
  + Lip, 3-lobed; lobes broad and short.

** Orchis Morio, Green-Winged Meadow-Orchis. O. maculata, Early Purple Orchis.

** Lip, 3-lobed; middle lobe dilated, bifid, and often with an intermediate tooth.

** O. ficulnea. O. Simia. O. ustulata.

** Bracts with three or more nerves; root-knobs undivided.

** Orchis flaviflora. O. maculata, Spotted Pale-flower-Orchis. O. latifolia, Marsh-Orchis.

** Glands of the pollen-masses united; root-knobs undivided.

** Lip erect in sertation.

** O. pyramidalis, Pyramidal-Orchis.

** Lip spiral in sertation.

** Orchis hieros, Lizard-Orchis.

** Babington, Manual of British Botany. ORDERS—contains objects in natural history classifications, subordinate to a Class, or sub-Class. It is, however, like many other general terms, used very loosely, especially by zoologists. In botany it is more definitely applied, and is used synonymously with Family and Tribe. In zoology Family and Tribe are frequently employed to denote groups subordinate to Orders. [FAMILIES OF PLANTS, S. 1.]

** Oregon, a Territory of the United States of North America, lies between 42° and 46° N. lat., 110° and 125° W. long. It is bounded E. by the Rocky Mountains, which separate it from the Territory of Nebraska; N. by the Territory of Washington; W. by the Pacific Ocean; and S. by the State of California and the Territory of Utah. At the census of 1850 the Territory of Oregon included the country since separated from it and formed into the Territory of Washington, and comprised altogether an area of 341,463 square miles. The area of Oregon Territory is 185,030 square miles. The estimated population, in 1857, was 42,000.

** Surface and Hydrography. The Territory of Oregon is traversed from south to north by the ranges of the Cascade and Blue Mountains, while a third range, that of the Rocky Mountains, forms its eastern boundary. The Cascade, or Coast, or Northern, range of the Sierra Nevada, is a continuous and very lofty range rising at a distance of 100 to 100 miles from the coast; and almost entirely cutting off direct communication between those portions of the Territory which lie east and west of it. Except where the Columbia, which forms here the northern boundary of the state, crosses through the range, the few passes which exist are so difficult as to be of little use to the traveller. The high peaks are from 12,000 to 14,000 feet above the level of the sea. The country west of this range is a good deal broken by spurs from the main chain. The greater part of this broken country is thickly timbered, in many parts there being dense forests of fir, pine, spruce, oak, ash, and other valuable trees, with close undergrowth of hazel, &c. The valleys and plains afford excellent sites for farming, the river courses being in some places a black vegetable loam, in others of clay and gravel. The uplands form good pastures. The harbours along the coast are, with the exception of that formed by the mouth of the Columbia, of little value; most of the other rivers have bars at their mouths, over which only vessels of little draught can pass. The coast itself is formed by steep sandy cliffs and beaches and is broken by projecting headlands which rise precipitously from the sea; the principal of these are Cape Blanco, Cape Perpetua, and Cape Look-Out, but they afford little shelter, and have mostly numerous rocks scattered about them, while everywhere a heavy surf sets in upon the beach. The Blue Mountains, which intersect the middle of the Territory, are as smoked and irregular as the Cascade and Rocky ranges. On the south-west the Blue Mountains are united with the Cascade Mountains by offsets, which form
the valleys of the Clamet and Umqua rivers, while the main chain forms the valley of the Willamette. Other offsets, diverging eastward, complete the range to the Cascade Mountain. This middle section of the state differs considerably from that of the Cascade range. The hills are barren, but in the valleys of the Columbia, Willamette, and Saptin rivers the soil is generally fertile, and in some places extremely so. The assaying of the vicinity of the Columbia and Saptin rivers consists of rolling prairie land, and affords good pasturage. The southern portion of this middle section is for the most part broken and desert, with scarcely a tree or vegetable. The general elevation of the latter is 1000 feet above sea level.

The Rocky Mountains have been noticed elsewhere. [Rocky Mountains.] They are of great altitude, and only one practicable pass has been discovered over them along the principal channel of the river; and though in some places partially timbered, it is by far the greatest part rocky, barren, extremely variable in climate, and incapable of permanent settlement.

The principal river of Oregon is the Columbia, which forms for a considerable distance the boundary between the Territory of Washington and Oregon, and joins the Columbia at the south-eastern extremity of Oregon, and is that crossed by the great stream of overland emigration to Utah and California. The country immediately west of the Rocky Mountains is everywhere broken by great spurs from the main chain, and though in some places partially timbered, is for the most part mountainous, barren, extremely variable in climate, and incapable of permanent settlement.

The Saptin, Snake, or Lewis River, sometimes called the Southern Fork of the Columbia, also rises in the Rocky Mountains and drains along the south-eastern border of the Territory, but receives from the principal channel of the river, and in some places near it, a length of nearly 1500 miles. The Saptin, in its course through Oregon receives numerous affluents, all or nearly all of which belong entirely to this Territory. Of these the principal are the Wasatucco, Fayette, and Sickly, on the right, and the Malheur on the left. Most of these rivers are of small size, and have little or no value for navigation. The Willamette, which rises on the west side of the Blue Mountains near 43° 30' N. lat., is one of the most important tributaries of the Columbia; it has a generally northern course and enters that river near opposite to sunny会长 at Oregon, considerably below where it becomes navigable; is itself navigable by small vessels for a considerable distance; and drains one of the most fertile valleys in the Territory. The rivers which rise west of the Cascade Mountains have mostly a short course and are of little service for navigation. Among these are the Columbia, the Clamet, and the Umqua.

The Umqua, which after the union of its two head branches, flows nearly west to the Pacific, into which it falls by Cape Gregory, about 45° 34' N. lat., is in its lower course a wide, shallow river, affording excellent water for navigation. The rivers of Oregon which fall into the Pacific, has its mouth obstructed by a sand bar. The Clamet, the most southern river of Oregon, is also the longest south of the Columbia; but there are few settlements along its banks, and its navigable capabilities are very limited.

Geology.—Of the geological features of Oregon only very partial examinations have been made. The mountain ranges belong generally to the igneous and paleozoic formations. Granite, trap, basalt, hornblende, and other eruptive and metamorphic rocks occur very widely, with slates, limestone, sandstone, &c. Gold is found in the sands of several of the rivers which flow from the Cascade Mountains to the Pacific; and it is said to have been also found in various places east of that range. Other minerals, especially iron, lead, and tin are also said to occur, but none of them have, we believe, been worked. We have not heard that coal has been found, though it is known to exist in Washington. Saline springs occur in the middle section of the Territory, and near its southern line in the vicinity of the Rocky Mountains.

Climate, Productions, &c.—The climate is very varied in the different sections of the Territory. Along the Pacific, and generally west of the Cascade range, it is mild and genial during the winter months. The region, on the east side of the range, is very severe; and snow seldom lies long on the ground. In the middle section the changes of temperature are much greater, and the winter much colder; but the air is more bracing, and the climate appears to be generally healthy. It is said that no dew falls in this section. In the vicinity of the Rocky Mountains the changes of temperature are extremely great and rapid. In the south-eastern part of the territory along the line of the great emigration route, the climate is very variable, but rain seldom falls, and there is little snow.

What is the principal grain crop? But a considerable quantity of oats is also grown. Maize is cultivated, but not to any great extent. The other grains are scarcely cultivated at all. Pasture is very abundant, and few other crops are raised. Small quantities of tobacco, flax, &c., are grown. Most of the European fruits flourish in the valleys of the Columbia, Willamette, &c. At present however the chief dependence of the settlers is perhaps upon the rearing of swine, which are kept for the purpose of producing the excellent pasture. Horses, horned cattle, sheep, and swine are already very numerous; and butter, cheese, and wool receive much attention from the agriculturists. Oregon has no game of the four-horned animals, but their numbers are rapidly diminishing; beavers, musk-rats, and martins are the chief which are left. Their collection is still carried on almost exclusively by the officers of the Hudson’s Bay company. In the forests bears, wolves, foxes, deer, elk, antelopes, and other game are still very abundant. Vast quantities of aquatic birds frequent the rivers in the spring and autumn. Along the coast whales are found; and edible fish are extremely abundant both along the coast and in the rivers; the salmon, especially on those which form the fine fishery of the food of the Indians. The principal fish taken are salmon, sturgeon, cod, ray, carp, smelt, and innumerable other small fish, with crabs, oysters, mussels, and other shell-fish.

At present the chief industry is chiefly confined to the production of the articles required in a very thinly peopled agricultural country, and those connected with the shipping trade. The commerce of Oregon is not minute, a considerable coasting trade being carried on with California; the export consists of large quantities of lumber, boards, flour, and provisions generally. There is also a good deal of trade carried on with New York, Boston, &c. The direct foreign trade is of little consequence.

Districts.—The state of Oregon is divided into ten counties. Salem is the political capital. All the towns are as yet but small; we notice some of the principal places; the population is that of 1850—

* * *

Sales, the capital, stands on the right bank of the Willamette; it has a small population, and little trade, but contains the state buildings, &c.

Astoria, on the Columbia, 8 miles from its mouth, population 323, is one of the oldest American trading places in Oregon, having been founded by Mr. J. Astor in 1811, but abandoned for a present time in 1826. The adjoining county, population 692, is one of the rising towns of Oregon. Oregon City, on the right bank of the Williamette River, 36 miles N.E. from Salem, population 695, is the chief town of the county of that name. The Columbia Valley is a flourishing district in Oregon. The city possesses a great amount of water power, and appears likely to become a place of considerable importance. Portland, on the left bank of the Willamette, above its confluence with the Columbia, 47 miles by E. from Salem, population 628, is also a busy and flourishing place, being the port of entry of an extensive and rich country.

The constitution was enacted by Congress in 1848; by it the right of voting is vested in every white male inhabitant of Oregon, 21 years of age, and a citizen of the United States, or who shall in the usual manner declare his desire to become one. The legislature consists of a council of 9 members, elected for three years; and a house of representatives of not less than 15 nor more than 30 members, elected for one year. All laws passed by this legislature must be submitted to Congress for approval. The governor is appointed for four years.

The coast of Oregon was visited both by the English and Spanish in the 16th century, and it has been much disputed to the mariners of which country the honor of the discovery is to be ascribed. Spanish writers claim its discovery for Ferrelo, the pilot of Cabrillo, who they assert reached 43° 30' N. lat. in 1542. All who claim the honor of the discovery, show that Drake in 1579 attained to 46° N. lat. The mouth of the Columbia, although Heceta in 1770 and Vancouver early in 1793, suspected the existence of an important river from the general appearance of the bay into which it empties itself, was not actually discovered until later in 1792, when a Captain Baker of the English
and formed but Nicolay, situated Tobacco, the fetid Vegetable tail American OUD Falconer work Twiss volatile nicious country Madrid, soverignity river Termes the published work of many Congress, 1819 to 1821 of 1814, was taken possession of by the English, but given up at the close of the war. After the treaty with Spain in 1819 the United States government first set up a claim, founded on the right of discovery, and also on their having by the treaty succeeded to the Spanish right of occupancy, to the exclusive possession of Oregon; and the claim involved the English and American governments on more than one occasion in very serious disputes. The question was not finally settled till 1866, when a treaty was concluded between the two powers, giving to the United States the entire country up to the parallel of 49° N., lat., including therefore the whole tract since formed into the territories of Oregon and Wash- ington. It was in the discretion of the United States to take the Columbia River as a line of communication with the Hudson’s Bay Territory. Oregon was constituted a Territory by Act of Congress, August 14th, 1848. (Statistical Gazetteer of the United States American Al- benz the United States; William Narrative of the United States Exploring Expedition; Green- how; Falconer; Wallace; Twiss; Nicolay, &c.) ORFILA, P., an eminent French, physician and toxicolo- gist, was born at Mahon, in the island of Minorca, on the 34th of April, 1787. He was sent to Paris to study medicine, and was naturalised in France in the year 1815. He early displayed a love for the science of chemistry, and in the application of this science to the investigation of poisons and their treatment became the most distinguished man in Europe. He was professor of medical chemistry in the Faculty of Medicine at Paris, and was subsequently for many years dean of that faculty. He was a correspondent of the Institute and a member of the Council of Hospitals. He wrote many works on the subject of toxicology, as well as on medical jurisprudence generally. His first published work was produced in 1817, and was entitled "Elements of Chemistry applied to Medicine and the Arts." This work was translated into English, and a second and third edition was published lectures on various departments of legal medicine. In 1821 he commenced the publication of a course of "Lec- tures on Legal Medicine," which was completed in 1823. Another series of lectures on the treatment of persons poisoned by opium and hydrocyanic acid was published in 1825. In conjunction with M. Lesueur, he published a work on "The Appearances presented by Dead Bodies after Exhumation, Drowning, Suffocation in Cesspools, or by Gases." He was also one of the editors of the "Nouveau Dictionnaire des Termes de Medicine, Chirurgie, Pharmacie, Physique, Chimie, Histoire Naturelle," &c. His greatest work on medical jurisprudence was his "Traité de Médecine Légale," in 4 vol., and published from 1826 to 1830. His original papers were numerous, and those on the absorption of lead, corrosive sublimate, silver, arsenic, and other metals, are most valuable contributions to toxicology. He devoted much attention to the subject of public health, and wrote a little work en- titled "Hygienie Precepts for the Use of Children in Primary Schools" (1845). One of his last works was "On the Pernicious Effects of Tobacco, and the Danger of Smoking Heavy Cigars." He died in the month of March 1853. ORIO CIEN (Canada) ORINOCO E., a natural order of Endogenous Plants, under which Lindley, in his "Vegetable Kingdom," includes the Acornia of Link and other authors. This order embraces the genera Prosopis, and Ambrosia, which are the types of three separate tribes. The genera are Ac- caxes, Liliaceae, Papaveraceae, and Araceae. It contains 13 genera and 70 species. Some of the species are used by man. Sclerococcus fusculus, the Skunk Cabbage, yields a foetid volatile oil. The Rootstocks of Calla palustris are edible. ORTHAGORISCUUS, a genus of Plectognathous Fishes, belonging to the family Gymnodontidae. On account of their round form the species are called Sun-Fishes. The genus has the following characters:—Jaws undivided, forming a cutting edge like a chisel, without spines; tail short and very high vertically; rays of the dorsal and anal fins long and pointed, both united at the caudal fin at the base. Two species of this curious genus have been taken on the British coast. O. cedrosa, the Short Sun-Fish, the Molobut, although only occasionally seen, has been taken around all the shores of Great Britain. When observed in our seas they have ge- neral!y appeared as though they were dead or dying, and hading along with the prows of ships. They are of different sizes, and of the other to view. This seems to be a natural position. O. oblongus, the Oblong Sun-Fish, Oblong Tetradon, Tana- cated Sun-Fish. This fish is larger, longer, and rarer than the last. (Yarrow, British Fishes) OSCILLATORIA. [Aloes.] OSMERUS. [Salmonidae.] OSSOIS TISSUE. [Tisuse, Organic, S. 1.] OSSOLI, MARCHIONESS. [Fulles, S. M., & 2.] OTTAWA, the capital of the Province of Ontario. [Home, N. S.] OTLEY. [Yorkshire.] OTTAWA, a city of Canada, previously called Bytown. [Browns, S. & S. to which the present notices, founded on new and original researches, are prefixed.] Bytown was derived from Colonel By, an officer of the Royal Engineers, whom the British government in 1827 commissioned to superintend the construction of the Rideau Canal. Bytown in 1854 was constituted a city, and the name was changed to Ottawa. The city is the seat of the Provincial Government, the matter was referred to the decision of Queen Victoria, who is stated to have chosen Ottawa as the future capital of the United Provinces of Canada. The situation is central for the whole of Canada, and has communication by river, canal, or railway, eastwards with Montreal and Quebec, and westwards with the Detroit River, through Kingston, Toronto, Hamilton, and Chatham. [Canada, S. 2.] Ottawa is situated at the entrance of the Rideau River, and was 87 miles W. from the confluence of the Ottawa with the St. Lawrence. At the western extremity of the city are the celebrated Chaudiere Falls, unsurpassed in America except the Falls of Niagara. The city is in Canada West, but a suspension bridge erected by the Pro- vincial Government just below the Chaudiere Falls spans the foaming mass of water, and unites Canada West with Canada East. A continuation of the Rideau Canal divides the city into Upper Town and Lower Town, entering the Ottawa by eight magnificent stone locks; and a massive bridge of cut stone, erected by the Royal Seap and Miners, crosses the Rideau Canal. At the northern extremity of the city and 3 miles above, the Rideau River pours itself into the Ottawa. The water-power for driving mills or machinery is immense on both sides of the Ottawa, and manufactures of various kinds have already been established. The city is well laid out, the streets wide and regular, the houses mostly of stone, and the principal quarters are lighted with gas. There are already several good hotels. The population now exceeds 10,000. The principal commercial outlet of the district is the port of the Ottawa, which from 18 to 18 millions of cubic feet are annually brought down the Ottawa and its tributary rivers. The Hull iron- mines, about seven miles from the city, are worked success- fully. The value of assessed property in 1856 was $2,300,000 dollars. Ottawa returns one member to the legislative Assembly. It has communication daily by steamer with Montreal and Kingston, and by railway twice a day with Prescott, on the left bank of St. Lawrence (24 miles), which connects with the Lake Champlain steamers. Ottawa is distant 296 miles W.S.W. from Quebec, 129 miles W. from Montreal, 95 miles N.N.E. from Kingston, and 23 miles N.E. from Toronto. OTTRELITE. [Michaellor, S. 1.] OTHELLO. In Shakespeare’s play, it is bound S. by Allab- bad, N. by Napani, E. by Bahar, and W. by Delhi. Its greatest length south-south-east to north-north-west is about 200 miles; its greatest breadth east by north to west by south is about 150 miles. The area is estimated.
A two-on and was the plaintiff but the defendant, he with many of the other nations that the revolution compelled the resignation of the king from the throne, and the annexation of the kingdom of Oud to the British possessions in India. The King of Oud was granted an annual pension of twelve lack of rupees (120,000). Oude forms a portion of the plain of the Ganges. The general character of the country, the capital city, Lucknow, are noticed under INDIA.

ODINOT, CHARLES NICOLAS, DUKE OF REGGIO, Marshal of France, and Grand Officer of the Legion of Honour, was born on the 2nd (some biographers state the 25th) of April, 1767, at Bar-sur-Oise. Having chosen the career of a soldier, in opposition to his father's wishes, he joined the regiment of Medec in 1785; but parental influence induced him to withdraw from the army four years afterwards. After a long interval revived his martial spirit, and, offering himself as a volunteer in 1791, his former service at once procured him a battalion. In September 1792 Oudinot defended the fort of Bisch against the Prussians, whom he repulsed with great success, and was promoted to the post of a colonel. In July, 1793, he was sent to the command of the regiment of Picardy, left vacant by its former colonel, whom the Jacobins excesses of the day had induced to emigrate. At daybreak on the 3rd of June, 1794, being stationed at a distant outpost, the Austrians fell in great numbers upon his regiment; but he, with his gun, for ten hours against a corps estimated at 10,000 strong, surrounded by the enemy's entire cavalry, he formed his men into a square, repulsed every charge of their cuirassiers, the last of which having opened a passage through them with fixed bayonets, he effected his junction with the main army, his lines never once having been broken. Instantly raised to a brigade for this intrepid conduct, he was sent to besiege Treves, and on the 7th of August 1794 captured the town by a skilful manœuvre. He next received orders to join the army of the Rhin-et-Moselle, which he did on the 14th of September. During a desperate night-attack, October 14, 1795, he was disabled by five sabre-cuts; and having fainted from the loss of blood, was taken prisoner by the Austrians. After some months in prison, he joined Moren's army in 1796, distinguished himself at the battles of Nordlingen and Donauwasser, captured several fortresses on the Danube, and was again most severely wounded at Ingolstadt. On the 26th of June 1797, having served in the campaign of Courbé before Constance, and penetrated into the town in spite of a second corps of Austrians by which it was defended. Oudinot was created a general of division, April 19, 1799, and on the 4th of June contributed effectually to the great victory of Zurich. Being subsequently appointed head of the staff in Massena's army, he shared with that commander the dangers and sufferings of the siege of Genoa. Twice during the siege he succeeded in passing through the English blockading fleet, bearing with him Massena's despatches to Schnetz. In 1800, as head of the staff under Brune, he obtained fresh honours at the battle of Pozzo and the passage of the Minio. The First Consul was so highly satisfied with Oudinot's conduct that he rewarded him with a sword of honour, to which he added one of the pieces of cannon captured from the enemy by Oudinot himself. At the opening of the campaign of 1805 Napoleon formed a picked corps of grenadiers, the command of which he intrusted to Oudinot, presenting him with the same time with the grand cordon of the Legion of Honour. At the head of his grenadiers he was the first to enter Vienna; he crossed the bridge over the Danube, though undaunted and despite the attacks of the enemy. General Oudinot was likewise present at Austerlitz. The following year he took possession of the counties of Neufchâtel and Valençay, relinquished by Prussia; and during his government conciliated the inhabitants by his liberality. After having afforded many facilities to theburghers of Neufchâtel evinced their esteem by a public address and the present of a sword. After the battle of Jena, October 14, 1806, he marched into Poland, and gained the victory of Ostrolenka, February 6, 1807. The defeat Napoleon now made him a count, to which he annexed a donation of a million of francs. But the 14th of June 1807, the morning of Friedland, was the most signal of his life. On that famous ground, with his single corps, he checked for four hours of the advance of the entire Russian army, after the sacrifice of half his men, enabled Napoleon to come up in time to win one of his greatest battles. Meeting the general after the action, Napoleon said to him, with unusual energy: "GENERAL, you are the wonder of the world wherever you are my only fear is for yourself." This incident has since afforded a subject for one of Horace Vernet's best pictures.

In the memorable campaign of 1809 the reputation of Oudinot was fully established; for after the death of Marshal Lannes, at Essling, the second corps, formerly commanded by him, was conferred upon Oudinot in these flattering terms:—"Given to you, as a general, tried in a hundred fights, in which equal skill and intrepidity have been displayed." After the battle of Wagram, Oudinot received the marshal's baton, with the title of Duke of Reggio, and a pension of 100,000 francs. In 1810, Louis Bonaparte, tired of submitting to the dictation of his imperial brother, threw him out of the empire, and appointed him Governor of Holland. Upon this defection Marshal Oudinot was ordered to take military possession of the country; he fixed his headquarters accordingly at Amsterdam. In this government he continued nearly two years, exhibiting great capacity and justice, and playing a notable part among the Dutch people by his integrity and conciliatory behaviour.

Throughout the whole of the subsequent campaigns of 1812, 1813, and 1814, the name of Marshal Oudinot reappears in every page of the honour, as one of the best-trained and most efficient of the imperial body of generals. After the first abdication he submitted to the restored Bourbons, steadfastly adhered to their cause during the Hundred Days, and was loaded with favours by Louis XVIII. and Charles X., and created a Marshal of France, the second in the hands of Angoulême in his expedition for the re-establishment of the King of Spain. He was appointed governor of the Invalides in 1842, and died at Paris, September 27, 1847, in his eighty-first year, having been upwards of sixty-four years in the French army.

The marshal's eldest son, Nicholas-Charles-Victor, the present Duke of Reggio, commanded the French army sent in 1849 to support the authority of the present pope in the Roman states. His younger son, an officer of great promise, fell into an ambush in the late wars in Africa, and was killed by the Arabs, June 26, 1853.

OUTLAWRY. Outlawry, in civil suits, was of two kinds, that on common process, and that on final process. The latter is a suit to recover a debt from a person supposed to be a defaulter, who cannot be tracked down by any legal means. The latter procedure was against a defaulter, rather than enabling a plaintiff to obtain judgment by default when the defendant does not appear, having been provided by the Common Law Procedure Act, 1852, outlawry on mesne process is by that statute abolished. Outlawry on final process may still be obtained by a judgment debtor, but there are so many other means of stripping him of all his property, that this mode of proceeding is rarely resorted to in practice.

OVE.E (Gray), a sub-tribe of the tribe Boswia and family Baculi. It includes the common Sheep and allied species. The following is Dr. J. E. Gray's definition of this family:—Forehead flat or concave. The horns are more or less spiral, wider than deep at the base, and slightly annulated in front. Two females are often heard together; the male has a more or less deep rounded subcortical pit, without any interspace; the masseteric ridge ascending high before the orbit; the auditory bulla small; the basioccipital flat, more or less expanded anteriorly by the extension of the anterior pair of tubercles, and the posterior pair of tubercles, being nearly equalized and sizable; and there are no supplemental lobes to the grinders. The hoofs are triangular, and being shallow behind, they have distinct interdigital fossae. Males emitting no stench. The genera included in this family are—

1. Ovs. Crumen distinct. Tail elongated. Skin covered with wool or adpressed hair.
2. Capra aries. Crumen distinct. Tail very short. Skin covered with thick hair, covering the wool.

Ovis aries, the Common Sheep, is subject to great variety, and many of its forms have been raised to the rank of species. Dr. Gray, in the 'British Museum Catalogue' enumerates no less than 233 varieties of this species.

In the article Snax the subject is treated chiefly with reference to farming and grazing. We here present a few of the varieties which are more interesting to the zoologist. The sheep is one of those animals which man has domesticated, and, judging by the horse, dog, cat, pig, and ox, is subject to the greatest possible variety. These varieties have been often described as species; but the most distinguished zoologists of the present day regard all the forms of Ovis as belonging to the species Ovis aries.

The following is a list of the varieties from the 'British Museum Catalogue':—

1. The Spanish Sheep. It is the Ovis Hispanicus of Linn.; called also the Merino Sheep and the British Middle-Wooleed Sheep.
2. The Common Sheep (Ovis aries rustica, Linn.; O. gallus, Dean.; O. brachyurus, Pall.; O. leptura, Schreb.) the Hornless Sheep (O. Anglicana, Linn.). Of this variety there are numerous forms, such as the Muggles Sheep and Shetland Sheep, the Southdown Sheep, the Old Lincoln Sheep, the Romney Marsh Sheep, the Cobweb Sheep, the New Leicester Sheep, the Cheviot Sheep, the Old Teeswater Sheep, the Improved Teeswater Sheep, the Dinky Sheep, the Zeland and Orkney Sheep, the Welsh Mountain Sheep, the Soft-Wooleed Sheep of Wales, the Wicklow Mountain Sheep, the Kerry Sheep, the Exmoor Sheep, the Black-Faced Sheep, the Black-Faced Heath-Sheep, and the Rams and Rosacs (Ovis Folia, Blyth).
4. The Hindi Sheep (Ovis Huma, Hodg.) the Hornless Black-Faced Sheep of Tibet. Also a native of Nepal.
5. The Cego (Ovis Cagia, Hodg.) the Kago, or Tame Sheep of Cabul region; the Cego Sheep of Grey. A native of Nepal.
7. The Curumbah Sheep of Mysore.
8. The Sheep called Gfdr in India.
9. The Dukham (Deccan) Sheep.
11. The Brazilian Sheep.
12. The Demerara Sheep.
15. The Guinea Sheep (Beller et Brevis des Indies, Buffon; O. A. Guineensis, Schreb.).
17. The Shyamb mixture of Myr isole.
18. The Sheep of Syria, of Buckingham.
19. The Pezhan Sheep, of Bennet, from Tripoli.
20. The Sheep of Ceylon; the Sheep of the Hair of the Shibboras, Capra Cretensis, Brison; Strepsicerus Cretica, Beach; Beller et Brevis des Vallesch, Buffon; Zoczk of the Austrians; Wachall Sheep of Beawi.
21. The Long-Tailed Sheep of Russia (O. longicaudatus, Brison; O. Dehlericus et Tedericans, Pallus).
22. The Broad-Tailed Sheep (O. longicaudatus, Erlz, Geoff., Mem. Egypt); Lesson, Comp. Buffon, x. 12; O. lactuca playthera s. Arabica, Linn.; O. Turica, Charlet; Bucharian Sheep (O. Bucharica, Pallus); the Tibetan Sheep (O. Tibetana, Fisher); the Cape Sheep (O. Capensis, Erzleb); the Sheep of Belkak.
23. The Many-Horned Sheep (O. polycrurus, Linn.). It is also called the Four-Horned Ram, and the Dumba Sheep. It is a native of Nepal.
24. The Puchia, or Hindustan Dumba (O. puchia, Hodgson).
25. The Short-Tailed Sheep (O. brachyura borealis, Pallus). It is a native of Northern Russia.
26. The Sheep of Tartary. They are said to eat bones like a dog.

The genus Capriose embraces the following species:—

C. F. Horn, the Sha, or Koeh. It is the Mountain Sheep of the north of India, and is found in Tibet.
C. orientalis, the Armenian Sheep. It is the Agrocerous Musimon of Pallus; the Ovis Musimon of Brandt. It is a native of Armenia.
C. musimon, the Mouffon. This animal has a multitude of synonyms. It is the Capra Ammon of Linneus, and the Ovis Musimon of other authors. It is the Wild Sheep and Siberian Goat of Pennant. It is found in Cypris, Candia, and Corsica. For figure of Mouffon, see Sizar, p. 359.
C. Ammotragus, A. Fragilis, the Aondad of the Moores of Babar and the Kabesh of the Arabians, is a native of North Africa. For figure, see Coarri, 'O. Cretensis, the Taye or Big Horn. It is the Osa monimus of Geoffroy, and a variety, the O. Calaminus of Douglass. Dr. Gray says it is probably the same as the Amon of Northern Siberia.

There is only one species of Pavo, the P. Nahoor, the Nahoor Nervar or Se. It is a native of Nepal.
C. Argali, the Argali. It is the Agrocerous Argali of Pallus, and often confounded with the former. It is a native of Siberia. Dr. Gray says of this species:—

"The Sheep of the Ubbars, or Wild Sheep, seldom or never cross the Hemachai, the Indian side of which range is the special habitat of the Nahoors, while to the north and west beyond the Thibet our animal is replaced by other species, so that Thibet may be considered as the special habitat of one species (Ovis Ammonoides), and the plateau north of Thibet as far as the Altai of another (Ovis Ammon), cited as types of the true ovin form; and it may be added, that the six sorts of tame sheep of Thibet and the Sub-Himalayas
all without exception exhibit the essential characters of that form.

"There are several species that may be confounded under this head: the Siberian Argali is found in the most northern part of that country, and it is probably different from the Himalayan animal; but I have not been able to discover any difference between the specimen received from Mr. Hodgson and 3, which were sent from Siberia by the Russian naturalist."

OVER. [Cimbris.] OVERSEER. The duties of overseers have by recent statutes been extended and modified in various matters of detail; but an outline of their duties given under Overseers, vol. xviii, p. 70, is still sufficiently accurate, no alterations being of sufficient moment to call for comment.

OVERTON. [Flintshire.] OVERTON, DR. A.DOLF, was born July 24, 1782, in the city of Hamburg. He was educated at the University of Bonn, and afterwards at the University of Berlin, where he took his degree. His favourite study was geology, which he pursued for some years. In 1840, when Mr. Richardson, at the expense of the British government, was preparing to undertake a journey to Lake Tchad, in Central Africa, Dr. Overweg and Dr. Heinrich Barth were selected to accompany him, in order to make scientific observations. An account of this expedition is given under the year 1852.

Overture died of an attack of fever, Sept. 20, 1852, at Madarari, about ten miles east from Kuka, and near the western shore of Lake Tchad.

Oxalis. [Oxalid.] OX-LOH. [Powdler.] OX-TONGE. [Helmithia, S. 8.]

Oxycoccus, a genus of Plants belonging to the natural order Ericaceae.

O. pauciflorus, the English Cranberry, is found wild abundantly in swamps of Norfolk, Lincolnshire, and many other parts of England, always by the side of little rills, and not among stagnant water; it has slender trailing thread-like shrubry shoots, clothed with tiny linear leaves, and has a 4-petalled pink corolla with the segments sharp-pointed and turned back. The fruit is a round an'tere red berry, which makes excellent tarts and one of the many kinds of maralade. The Russian cranberries of the shops are borne by this species. They are not gathered till after the disappearance of snow.

Near St. Petersburg the cranberry plant is so common, that the snow is stained crimson by the berries crushed to pieces by the passage of sledges over them.

Oxyrhynchus, the American Cranberry, is very like the other, but its leaves, flowers, and fruit are larger; and the latter has a more medicinal taste. It is imported from the United States in boxtops, in considerable quantity, and used for the same purposes as the other; but it is considered of inferior quality.

Oxygen. [Chemistry, S. 1.] Ozokerite. [Mineralogy, S. 1.]

Pacinian corpuscles. [Tissues, Organ, S. 1.] PAGNAS. [Pachyderm.] PAINSHAW. [Devonshire.] PAIXHANS, HENRI-JOSEPH, General of Artillery in the French army, was born January 22, 1783, at Metz, in the French department of Moselle. He received instruction in the Ecole Polytechnique, and having entered the artillery, rose by successive gradations to the rank of Colonel, and ultimately of General. He was also elected a member of the French Chamber of Deputies, and spoke occasionally on subjects connected with the army and navy. Several of his speeches were afterwards connected with his valuable works quoted hereafter. General Paixhans died August 19, 1854, on his domain of Jouy-sur-Arches, near Metz.

General Paixhans made important improvements in the construction of heavy ordnance, and also in the projectiles, in the carriages, and in the mode of working the guns. The Paixhans-guns are especially adapted for the projection of shells and hollow shot, and were first adopted in France about the year 1824. Similar pieces of ordnance have since been introduced into the British service. They are suitable either for ships of war, or for fortresses which defend coasts.

The original Paixhans-gun was 9 feet 4 inches long, and weighed nearly 74 cwts. The bore was 29 centimetres (9 inches nearly). By judicious distribution of the metal it was so much strengthened about the chamber, or place of charge, that it could bear firing with solid shot weighing from 86 to 88 lbs., or with hollow shot weighing about 60 lbs. The charge varied from 10 lbs. 12 oz. to 18 lbs. of powder. General Paixhans was one of the first to recommend cylindro-conical projectiles, as having the advantage of encountering less resistance from the air than round balls, having a more direct flight, and striking the object aimed at with greater force, when discharged from a piece of equal calibre, whether musket or great gun. As large ships of war, particularly three-decked ships, offer a mark which cannot be missed, even at considerable distances, and as their weight and size make the long and strong 12-pounder shell project horizontally could not pass through them, an explosion taking place would produce the destructive effects of springing a mine, and far exceeding those of a shell projected vertically, and acting by concussion or percussion. In accordance with these views, General Paixhans recommended the use of smaller ships carrying heavier guns suitable for projecting shells and hollow shot; and advised his government to avoid the construction of large ships, and the equipment of any ship for shell-firing to such an extent as to expose her the greater part of her crew by the explosion of her guns in action.
PALARUS. [Laridnre.]
PALEA. [Cataphidum.]
PAINON, PALEMONIANs. [Sriimt.]
PALM-TREE WINE. [Bolus.]

Palmblad, Wilhelm Fredrik, a Swedish writer of considerable note, was born on the 5th of December, 1788, at Ljusned, near Soderkoping, the 11th child of a military commissary, who had procured the situation of Kronofogde, or collector of taxes. The property of the family must have been considerable, as young Palmblad, when a student at Upsal, and before attaining his majority, bought, in conjunction with another student, the university printing-office, and forthwith commenced a series of publications, which had for their object to effect a revolution in Swedish literature. Many of the works published during this new periodical by Atterbom and Palmblad, appeared in July 1810, within a month of his taking possession of the printing-office; at Christmas of the next year appeared the first number of the 'Poesiakalender,' the earliest Swedish annual, and in the beginning of 1813 the first of the 'Svenske Litteratur Tidning,' or 'Swedish Literary Gazette.'

The 'Tidning,' which lasted for eleven years—up to 1824—was the most long-lived Swedish literary periodical on record; while the Danses could, in 1824, boast of one that had outlived a century. Its circulation, we are told by Palmblad, was never upwards of 200, and averaged about 100; yet it had a great influence on the cultivation of Swedish literature. It excited the astonishment of the public, and was attacked by all schools and sects of literature, which at that time was entirely French in its models and its opinions; and on one occasion the Rector of the University of Upsal summoned Palmblad, as the universal printer, to inform him, that if his periodical contained any more unfavourable criticisms upon the Swedish Academy, his privilege would be withdrawn. The Swedish Academy had been founded in imitation of the French Academy by Gustavus III., who was accustomed to declare that there were but two things held in higher admiration—namely, the German language and tobacco. One of the chief objects of the new school—which from the title of its first periodical, the 'Phosphores,' became known by the name of the 'Phosphores'—was to introduce the Swedish public to some knowledge of the masterpieces of Goethe and Schiller; and in spite of the efforts of the Academy, which in the first instance looked upon the Phosphorists as a body of continuations rebels, the result was general though not local success. Afterborn, the chief leader of the party, was indeed too fantastic in the character of his own writings to become unconditionally popular; but before the close of his career he was elected a member of the Academy of which he had been the assaliant. Tegner and Gjeller, who had censured some of the proceedings of the new party, were violent and interlaced, were themselves much more averse to the principles of the old; and, finally, an almost complete revolution took place in the aspect of Swedish literature.

Palmblad was born in both the student life and the press, continued to contribute to the periodicals that successively arose on the ruins of each other, the 'Journal of the Swedish Literary Union,' 'Svea,' 'Skandia,' 'Mimer Frey,' &c., and also pursued an academic career. In 1823 he became 'Docent' or tutor of Swedish history at the university, in 1827 assistant professor of geography and history, and in 1830 professor of Greek. Many of his numerous works are on the subjects which occupied him as professor: his 'Handbook of Physical and Political Geography' (5 vols., Upsal 1826-27) is of high reputation, and has been translated from Swedish into German. His poetical translations of Sophocles (1841) and of Aeschylus (1849) are of some note. The poetical works of Greek however he often felt an inclination to return to an easement of writing novels, and his 'Falkenvard Family,' (2 vols., Orebro, 1844-45), and 'Aurora Konigmark' (6 vols., Orebro, 1846-61), met with much success, and were translated into German. The work known as 'Remains,' which, according to the great 'Biographical Dictionary of Celebrated Swedes,' which he left incomplete at his death, on the 2nd of September, 1855.

This dictionary, 'Biographiskt Lexicon over namnligna Svenska Män,' commenced in 1833, was interrupted at Professor Palmblad's death, but is now again in progress. The last volume which we have seen is the twenty-sixth, which brings it as far in the alphabet as the end of the letter W. It embraces the names of the living as well as the dead, and a considerable portion of the information it contains is derived from private communications or from personal observation, and embodied for the first time in its pages. It aspires to give an account of every Swedish name of note, and a list of the works of every Swedish author. The only other biographical dictionary of the same kind that the Swedish possesses, is that of Gzelius in three volumes, and a supplement commenced in 1778. But the new work is on a much larger scale in every way than the somewhat meagre complication of Gzelius. Many of the lives are given in considerable length, several are autobiographies, the account of Palmblad himself. On the other hand, some of the lives of living persons are little more than a string of dates, with a record of promotions; but such inequalities are of course unavoidable in a work of the kind. The body of the work is generally known as 'Palmblad's Biographical Dictionary,' but does not bear his name in the title, and in his life he speaks of himself as only one of the editors, and the author of a considerable number of the lives. It is one of the most indispensable books in a Swedish library, and will, as it comes to be more generally known, do much to spread abroad the knowledge of the illustrious names of Sweden.

Palmipes, a genus of Star-Fishes belonging to the tribe Gosinidiae and family Astroidea. The body is thin, flat, and pentagonal, and covered above and beneath with fasciculated spines; avenues bordered by longitudinal fasciculi of spines; suckers visceral. The species of this genus are not numerous.

P. Branchipes, the Bird's-Feet-Star-Sea, is a British species. It has broad ample sub-acute lobes. Colour white, with red rays and border. It is the thinnest and flattest of all its class. It ranges from the Arctic seas to the Mediterranean.

(Forbes, History of British Star-Fishes.)

Panarla. [Lapri Islands.]

Pangiacce, a natural order of Dichotomous Exogenous Plants. This order embraces three genera, the species of which are trees with alternate stalked entire leaves, polyetalous axillary monocious flowers, with scales in the throat of those bearing pistils. The stamens are five, the seeds large and oily. Dr. Lindsley says, 'What the distinction is between these plants and Papyses, except that the last are monopetals, and have no folial scale sides in the g flowers, it is hard to say.

The species are found in the hotter parts of India. They are all poisonous. The natives of India employ extensively in medicine the seeds of these plants, which are known by the names of Chaulmouga and Patalmouga. The genus Hydnocarpus, formerly referred to Phocourosaroe, belongs to this order.

Panias. [Panias.]

Panorne. [Planina.]

Panorbes. [Crassidiom.]

Papanastes. The area and population of the Papal States are distributed as follows over 20 provinces, 6 of which, called Legations, are governed by a Cardinal legate, and 14, called Delegations, are administered by dignitaries of lower degrees:

<table>
<thead>
<tr>
<th>Province</th>
<th>Square Miles</th>
<th>Population in 1850.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roma-Comunica</td>
<td>1,699</td>
<td>304,266</td>
</tr>
<tr>
<td>Bologna</td>
<td>1,292</td>
<td>367,349</td>
</tr>
<tr>
<td>Ferrara</td>
<td>1,159</td>
<td>269,830</td>
</tr>
<tr>
<td>Forli</td>
<td>683</td>
<td>208,087</td>
</tr>
<tr>
<td>Ravenna</td>
<td>674</td>
<td>175,338</td>
</tr>
<tr>
<td>Urbino-Conza</td>
<td>1,358</td>
<td>241,612</td>
</tr>
<tr>
<td>Veleti</td>
<td>629</td>
<td>35,356</td>
</tr>
</tbody>
</table>

Delegations:

<table>
<thead>
<tr>
<th>Province</th>
<th>Square Miles</th>
<th>Population in 1850.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ancona</td>
<td>424</td>
<td>172,393</td>
</tr>
<tr>
<td>Macerata</td>
<td>861</td>
<td>239,942</td>
</tr>
<tr>
<td>Casserino</td>
<td>311</td>
<td>36,055</td>
</tr>
<tr>
<td>Fermo</td>
<td>317</td>
<td>311,757</td>
</tr>
<tr>
<td>Formia</td>
<td>87,724</td>
<td>87,724</td>
</tr>
<tr>
<td>Parigi</td>
<td>1,447</td>
<td>222,996</td>
</tr>
<tr>
<td>Spoleto</td>
<td>1,136</td>
<td>123,765</td>
</tr>
<tr>
<td>Terni</td>
<td>77,277</td>
<td>77,277</td>
</tr>
<tr>
<td>Viterbo</td>
<td>1,083</td>
<td>125,974</td>
</tr>
<tr>
<td>Orvieto</td>
<td>301</td>
<td>26,450</td>
</tr>
<tr>
<td>Frascati</td>
<td>720</td>
<td>148,378</td>
</tr>
<tr>
<td>Civita Castellina</td>
<td>373</td>
<td>20,353</td>
</tr>
<tr>
<td>Benevento</td>
<td>53</td>
<td>23,040</td>
</tr>
</tbody>
</table>

Total | 15,281 | 3,006,771 |
adapted to the requirements of the profession in the present century. He retained his position as president till his death, on the 24th of December, 1856, and was succeeded by Dr. Thomas Mayo.

Dr. Par's devoted much attention to the study of the physical sciences generally and astronomy. When in Cornwall he conferred a great benefit on the mining population by suggesting that the bar used for moving portions of rock, should be covered with copper, which prevented the iron of which it was composed from striking fire against the rock, and which by igniting charcoal used in blasting, often produced the most serious ill consequences. In London he became an early member of the Royal Institution, and was the friend and biographer of Sir Humphry Davy. His 'Life' of Davy was published posthumously by his widow. He wrote anonymously a little work of great merit, and which has gone through many editions, entitled 'Philosophy in Sport made Science in Earnest.' He was a Fellow of the Royal Society, and a Doctor of Civil Law of the University of Oxford.

PARLIAMENT, IMPERIAL. The alterations which have been made in the law relating to the election of members of Parliament, and the constitution and powers of election committees, have been mentioned under Elections.

PAPANE, E. Meiser's name for the family of Plants called by Linneæus, N. Scand. Brown named this tribe, after Nicæum, Nicæa, which is now most commonly adopted. [NL: Nicæa]

PARRY, SIR EDWARD, Knight, Rear-Admiral of the White, was born December 19, 1790, at Bath, in Somersetshire. His father was Caleb Hillier Parry, M.D., a physician of some celebrity. His mother was the daughter of John Rigby, Esq, of Lancaster.

Edward Parry was the second of five sons called when a boy (and generally known afterwards as Sir Edward Parry), was educated in the grammar-school of the city of Bath, where he attained a knowledge by no means contemptible of the Latin and Greek languages. His first object was medicine, and he intended him for the medical profession, but in 1803 Miss Cornwalls, a near relative of Admiral the Hon. William Cornwalls, then in command of the Channel fleet off Brest, induced them to change their purpose. She thought he had the qualities suitable for a naval officer, and that her influence would suffice to float him off comfortably. As he had no objection to make trial of a sailor's life, in June 1803, through the kindness of Admiral Cornwalls, he was appointed a first-class volunteer on board the Vindictive. After the ship was captured, and he was taken prisoner, he was made a midshipman. The Vindictive was then sent on to the Mediterranean, and the six days' passage was occupied in teaching Parry the rudiments of navigation.

Parry, once a volunteer, was now a midshipman. He was the first pupil of Mr. John Franklin, then a midshipman in the same ship. His progress excited the notice of the officers, particularly of Mr. John Barraclough, who had charge of midshipmen. Parry showed a great force of mind and activity, and was induced to read and study. He had a great capacity for language, and was well suited to the life of a sailor. In 1808, when he was 17, Parry was made a midshipman on board the Tribune frigate, as a midshipman. The Tribune was employed about two years in cruises off the French coast; but in the spring of 1808 Captain Baker was promoted to the Tribune to the Vanguard, 74, which belonged to the Baltic Station. Parry, who had been assigned to the Vanguard, was then transferred to the Twins, and parried off the Downs in December 1809, and Parry obtained his commission as lieutenant, January 6, 1810. Early in February the same year he proceeded to Sheerness to join the Alexandria frigate, which was about to sail on service in the Baltic, and was afterwards employed in the northern seas in protecting the Epiphanes whale-fishery. During that period Lieutenant Parry was a good deal employed in making astronomical observations, and in improving the Admiralty charts of the Baltic. In January 1811, Parry was appointed to the Lady Nelson, and proceeded to Halifax in Nova Scotia, to join the La Hogue, 74. Great Britain was then at war with the United States, and Lieutenant Parry having joined the La Hogue in the summer of 1813, in the spring of 1814 was engaged in a successful post-exposition, which ascended the St. Lawrence to Connecticut as far as Petitpaine Point, and destroyed several privateers and other vessels, in all 87, valued at 50,000L, with the loss of only two men killed.

After the Peace of Ghent he returned to England, but Lieutenant Parry, in hopes of preferment, remained on the North American station in the Maidstone frigate, and afterwards in the Ardent, 64, the Carron, 20, and the Niger, 36. He continued on the North American station without interruption, until the 1st of July 1817, when he was appointed to the schooner Lynx, and proceeded to the Cape of Good Hope. The voyage was in consequence of his father having suffered a severe attack of paralysis. While on the North American station in the La Hogue he drew up a little work for the use of the junior
officers of the fleet on that station, and distributed it in manuscript. It was afterwards printed, under the title of "Nautical Astronomy by Night, comprehending Practical Directions for knowing and observing the Principal Fixed Stars of the Northern Hemispheres; to which is prefixed a Short Account of the most interesting Phaenomena in the Southern Hemisphere; the whole illustrated by several Engravings," 4to.

Lieutenant Parry was desirous of joining the expedition to the river Congo in Africa, but owing to his having been detailed for some time, he did not proceed until the end of 1817, when it was too late. Meantime, in consequence of a report that the Arctic seas were then much less encumbered with ice than usual, the Admiralty had fitted out two expeditions for those seas, one under Captain Bouch and Lieutenant More, and the other under Commander John Ross for the purpose of exploring Baffin's Bay, and ascertaining the probabilities of a North-West Passage from the Atlantic to the Pacific. Parry having heard of these expeditions, wrote to request employment, observing that he was "ready for hot or cold, Africa or the Arctic regions." When he arrived in London, he was introduced to Mr. Barrow, secretary to the Admiralty, who soon afterwards appointed him to the command of the Hecla, under Commander John Ross in the Isabella. The Isabella, followed by the Alexander, left the Thames at the end of April 1818. On the 19th of August the two ships were off Smith's Sound at the northern extremity of Baffin's Bay. They then turned southward, and the Hecla was ordered to proceed towards Jones's Sound, and on the 30th reached the wide opening of Lancaster Sound. The water was deep and free from ice, and on the following day both ships under a press of sail were steering westward up Lancaster Sound. Parry was full of expectation, as well as all the crew on board the Alexander, when suddenly the Isabella tacked, turned her head eastwards, and rejoined the Alexander. Both vessels then traced their course, and Lancaster Sound was left behind. Consequently, the Hecla, which had been ordered to proceed to the Croker Mountains, passing the passage to the westward. The two vessels entered the Thames on their return in November of the same year.

Lieutenant Parry's opinion is that there was an open passage up Lancaster Sound, and that the Croker Mountains were a mistake, though privately expressed, was soon known at the Admiralty. He had interviews with Mr. Barrow, and was introduced to Lord Melville; and a second expedition for the discovery of a North-West Passage having been resolved upon, the Hecla and Gipsy were taken into dock at Deptford to be repaired and strengthened for service in the Arctic seas. Parry was appointed to the command of the Hecla and of the expedition. Lieutenant Liddon being placed in command of the Gipsy, the Hecla proceeded for the Thames on the 11th of May 1819, and having sailed up the eastern side of Davis's Strait and Baffin's Bay, on the 21st of July they were in 73° N. lat., nearly opposite to the entrance of Lancaster Sound, being bound to the westward, in the direction of the ice to the west intercepting their passage to it. Through these masses however, with excessive labour and frequently exposed to great danger of being crushed, the ships forced their way; and on the 28th of July reached open water on the western side of the ice, having passed through eight or nine miles of it. They entered Lancaster Sound, and sailing westward through the imaginary Croker Mountains, on the 4th of September crossed the meridian of 110° W. long., in 58° 42' N. lat., which they were entitled to a reward of 5000l., offered in an order in council to be bestowed on his Majesty's subjects as might succeed in penetrating thus far to the westward, within the Arctic Circle. Parry gave the name of Barrow's Strait to the continuation of Lancaster Sound; discovered Mel's island, having on its northern side, and from its vicinity described the high coast on the southern side, which he named Banks' land, which but Sir Robert McClure has since ascertained to be the northern side of Banks Island. Parry also discovered Prince Regent's Inlet and the Wellington Channel, and accompanied as far as the 54° 43' W. long. On the 26th of September, after three days of arduous labour in cutting a channel, with the thermometer nearly at zero, both ships were got safely into their stations, lying on the north-west coast of Melville Island. There the ships remained frozen up, with the sun entirely below the horizon from the 11th of November to the 7th of December, and were not released from the ice till the beginning of August 1820. After making several attempts to advance farther westward, they were compelled to return to England, and entered the Thames on November 1820. On the 4th of the same month Lieutenant Parry was promoted to the rank of commander; and several other rewards and honours, F.R.S., &c., were bestowed upon him.

An expedition was soon afterwards made for another expedition. Captain Parry received a commission, dated December 30, 1820, for the Fury, with Captain G. F. Lyon under his orders in command of the Hecla. This expedition was much less fortunate than the former. It sailed from Plymouth on the 1st of June 1821, and having embarked his Majesty's ships on the 8th of October the ships were frozen in at Winter Island, where they remained till the 2nd of July 1822. They were then released, and sailed northward up Fox Channel. Having discovered the Fury and Hecla Strait, the ships were again frozen in on the 31st of October at the island of Igloolik, at the eastern end of Fury and Hecla Strait. There they remained till the middle of August 1822, when they commenced their voyage homewards, and entered the Thames on November 10, 1822. Captain Parry's "Narrative of a Second Voyage for the Discovery of a North-West Passage," published in 1825, was rewarded by his Majesty's commending him for his desert. In December 1823 Captain Parry was appointed Acting Hydrographer to the Admiralty.

The Hecla and Fury were soon afterwards refitted for another Arctic voyage, the Hecla commanded by Captain Parry and the Fury by Captain H. P. Hoppner. They sailed from the Thames on the 8th of May 1824, passed the following winter at Port Bowen in Prince Regent's Inlet, and remained there frozen up from the 28th of September till the 10th of February 1825. At about that time the Fury was wrecked, and the Hecla reached England, with a double ship's company, in the following October. Parry's "Journal of a Third Voyage for the Discovery of a North-West Passage" was similarly published, in 4to., in 1828.

After his return Captain Parry was appointed Hydrographer to the Admiralty, and continued to perform the duties of the office till the 10th of November 1828. Having then proposed a plan for reaching the North Pole, and obtained sanction for it, he was again appointed to the command of the Hecla for that purpose, and sailed from the Thames on the 3rd of April 1827. The Hecla was secured in Trenen Berg Bay, on the north coast of Spitsbergen, on the 21st of June; and on the 22nd two flat-bottomed boats, each with a crew of ten men, were sent to the north-west coast, and proceeded northward. One boat, with twelve men, was commanded by Captain Parry; the other, with the same number of men, by Lieutenant James C. Ross. The remainder of the crew, under the charge of Mr. Gore, were left on board the Hecla. With excessive labour the boats were paddled through the water and dragged over the ice till they attained the latitude of 83° 45', which is the nearest point to the North Pole ever yet reached. Finding them that a correct was taking them southward as fast or faster than they could advance northward, they commenced their return, and reached the Hecla on the 21st of August, after an absence of sixty-one days. The Hecla began her return voyage on the 28th of August, and Captain Parry reached Baffin's Bay on the 17th of September. Captain Parry had ascertained Parry's arctic labours in the Arctic regions. His "Narrative of an Attempt to reach the North Pole in Boats fitted for the Purpose," and attached to his Majesty's Ship Hecla, in the Year 1826, was rewarded by the authority of the Duke of Clarence, then Lord High Admiral.

Captain Parry resumed his situation as hydrographer; but, as his health was considerably from close attention to the duties of his sedentary occupation, he occupied the offices of Secretary of the Royal Geographical Society, and Governor of the New South Wales. Previously however to his departure from England, he received the honour of knighthood from George IV., together with Sir John Franklin, April 25, 1829; and Sir John Franklin was also invested with degrees of the C.L.C. on the 30th of December by the Universities of Oxford and Cambridge; Sir Edward sailed from the Thames for Australia on the 20th of July, and reached Sydney on the 13th of December. His
residence as commissioner was at Port Stephens, about 90 miles north from Sydney. He entered the Thames on his return, with his wife and family, in November 1834.

In March 1835 Sir Edward Parry was appointed an Associate Justice of the Supreme Court of New South Wales, but his health giving way under the pressure of work, he resigned the office within a year. In 1837 he was appointed to organise the packet-service between Liverpool and Ireland. From the 19th of April 1837 to the 31st of December 1846 he was at a distance from his family, and resided at Rosario, Paraguay. He then retired from active service, receiving the appointment of Captain-Superintendent of the Royal Clarence Yard and of the Naval Hospital at Haslar, near Portsmouth. On the 2nd of August 1847, he was made a Companion of the Order of the White. At the end of 1853 he received the appointment of Lieutenant-Governor of Greenwich Hospital, a situation which he retained till his death, which took place on the 7th of July 1866, at Bens in Germany, where he had been residing for the benefit of his health. His body was brought to England, and interred in the cemetery at Greenwich.

Sir Edward Parry married, October 83, 1826, Isabella Louisa, fourth daughter of the Lord Stanley of Alderley. She died March 18, 1851. On the 19th of April 1841 he married the daughter of the Rev. Robert Hankinson of Walpole in Norfolk, and widow of Samuel Hearne, jnr., Esq. By his first wife he had two sons and two daughters, and by his second wife, who survives him, two daughters.

He was a member of the House of Commons, and recently Memoirs of Rear-Admiral Sir W. Edward Parry, Knt., F.R.S., &c., Late Lieutenant-Governor of Greenwich Hospital, by his Son, the Rev. Edward Parry, M.A., of Balliol College, Oxford, and late Tutor in the University of Durham, &c. 6vo. Longman, Hurst, Rees, Orme, and Brown.

PARSONSTOWN. [Bran.]

PARTNERSHIP. [Joint-Stock Companies, S. 2.]

PASENG, GOAT.

PASKIEVICH, IVAN FEDOROVICH, a Russian field-marshal, Prince of Warsaw, and Viceroy of Poland, was descended from a family of the Greek religion, bearing the name of Paskiewicz, which was driven from Poland in the 17th century by the persecution of the Jesuits. He was born on the 19th of May (new style) 1781, at Pulwara or Polwia, famous for the battle which decided the ascendency of Russia over Sweden. After receiving his education at St. Petersburg, he held the appointment first of page and afterwards of aide-de-camp to the Emperor Paul, and subsequently to the Emperor Alexander. He first saw service at the great battle of Austerlitz in 1805. In 1806 he was sent with the Russian ultimatum to the Porte, and in those days of Turkish harrieries owed to his own determination and firmness, the Sultan's public conduct to the country. Not long afterwards he was taken up for dead from the ditch of Brailov, where he had mounted to the assaut: he was promoted as a reward to the rank of colonel, and from that time his advancement was rapid. In the great campaign against Napoleon the Russians adopted the system of outward-looking batteries being put in command of a division, which at first amounted to only 4000 men, but subsequently rose to 80,000, took an active share in the triumphant campaign in Germany, and was one of the captors of the Palais. After the peace he accompanied the Grand Duke Michael on a three years' tour through Europe. On the accession of the Emperor Nicholas in 1826 he was named successor to Yermolov, in command on the Persian frontier, at the time of the outbreak of the war. The account of his conduct during the war, and the result of it, that it was doubted by the Russians, probably for the first time in Russian history, if a subject would yield obedience to the emperor's orders, and it even occasioned some surprise that "the King of the Caucasus" allowed himself to be dethroned so easily. Paskievich, on the 26th of September 1826, defeated the Persians under Abbas-Mirza at Elisabethopol; later in the same year he crossed the Araxes; early in the next year he conquered all Persian Armenia, and on the 23rd of December 1828, he was made Continental Grand Commander by the emperor's order bore the name of Paskievich-Krivansky to commemorate the exploit. The peace with Persia, established by the treaty of Turkmanchay (32nd of February 1828), was almost immediately followed by war with Afghanistan, and the following year Eremov, receiving in reward the title of field-marshal. A year of desultory warfare against the Circassians in 1830 was followed in 1831 by the campaign against the Poles, to whom the name of Paskievich sounded as that of a countryman. He took the command of the Russian army after the death of Diebitsch, and, more fortunately than his predecessor, was soon able to announce the fall of Warsaw. Raised to the rank of Prince of Warsaw, and made Governor-general of Poland, he was the subject of the organic statute of the 26th of February, 1834, which unites Poland to Russia, and for the next sixteen years carried out his plan of subjecting the country, one of the main points of which was the conversion of Warsaw into a strong fortress against any enemy. By his success against an invading Austrian army. He succeeded so well, that 1848 passed over Russian Poland without a revolt, and in 1849 the Emperor Nicolas could spare him to crush the Hungarians. As on former occasions, he now did not make use of the objects of military critics, but with his usual good fortune he was enabled to commence a deep draft in the emperor in August with the words, "Hungary is at your feet." In 1850 the jubilee of his fiftieth anniversary in the service was celebrated with great rejoicings at Warsaw, and on this occasion the Emperor of Austria and the King of Prussia nominated him a field-marshal in their respective armies. This was the culminating point of Paskievich's long career. When the recent war broke out between Russia and Turkey, the veteran general summoned to the field, though, as is said, against his will. He planned the campaign against the Turks, which terminated disastrously for the Russians in the repulse of their attack on Siliistra, and in that repulse Paskievich himself was wounded. After a long and tedious illness he expired at Warsaw on the 29th of January 1866.

Marshal Paskievich was married to a lady who was a relative of Emperor Alexander, his companion in some of his Persian campaigns, and had by her four children, one of whom, a son, Fedor, is a colonel of the Russian guards, and has also made his appearance as an author. A separate life of the Marshal in French was published by Teosey at Paris in 1835.

PASSEY. [SPARROW.]

PASSIFLORACEE, Passion-Flowers, a natural order of Hypogynous Exogenous Plants. This order is included by Lindley in his alliance Pedaloide. It is characterised by possessing peltate or spatulate corollina flowers; ovary hypogynous, flower petals; stamens on the stalk of the ovary; simple terminal style; spiralled seeds; and stipitate leaves. The species are herbaceous plants or shrub, usually climbing, very seldom annual. Considerable difference of opinion exists among botanists as to the real nature of the floral envelopes of this remarkable order. Jussieu and De Candolle, regarding the petal called petals as a second row of sepals, have made the order a sub-order of concerning, some of the species of the second row of floral envelopes as petals, and made it poly-petalone. Lindley makes the affinity of this order with Samyleaceae, Capparidaceae, Malacertibecrane, and Papaveraceae. Most of the useful properties of this order are included in the common genera of Passiflora, the tropical species of which the West Indian climber, is said to be anthelmintic and diaphoretic. Besides the fruit of several species of Passiflora, the fruit of Tanaclor mollissima, T. trifascia, T. speciosa, and Passiflora adusta are all of them edible. The species are principally found in South America. There are 10 genera and about 86 species.

PASSION-FLOWERS. [PASSIFLORACEE, S. 2.]

PATELEY-BRIDGE. [Yorkshire.]

PATTERSON, C. S. [Paten.]

PAULUS, HEINRICH EBEBARD GOTTLOB, was born on September 1, 1761, at Leonberg, near Stuttgart. He first proposed devoting himself to the study of medicine; but becoming attached to the sect of Pietists, he soon turned his attention to the study of mathematics, and afterwards he pursued his studies. By the liberality of the Baron von Palm he was shortly enabled to travel in France and Saxony, in order to examine the state of education. He afterwards studied the Oriental languages at Leyden, and
then again assisted by Palm, proceeded to London and Oxford to prosecute his studies. On his return to Germany he contributed in 1790 professor of the Oriental languages in the University of Jena. Here he occupied himself in illustrating and explaining the Old and New Testaments in a philological-historical manner, which first developed to the German public in 1788–90, in several books, and in 1793, with others. To these succeeded his "Philologisch-kritischer und historischer Commentar über das Neue Testament," which was given to the world in 4 volumes in 12mo, which he corrected and added much to his reputation. In 1793, on Döderlein's death, he was created professor of theology, but on account of his health, he removed in 1803 to Würzburg in a similar capacity, where he became also a chancellor of the consistory and president of the synod. To obtain that latter theological professorship at Würzburg, he was sent to inspect the state of the schools and churches, in 1806 to Bamberg, in 1809 to Nürnberg, and in 1811 to Ansbach. In this year a call to the chair of exegesis and church history in the University of Heidelberg restored him to his academical life, and to his literary activity. In 1814 the endeavours then being made to give a constitution to his native state of Würtemberg excited his attention, and in 1819 he commenced writing in a popular way, and on a considerable scale, his essays upon important subjects, such as proselytizing, under the influence of the Papist government on the national Roman Catholic Church of Germany, and others, gained great applause. In this he continued to write till 1829. As a theologian, he is distinguished by the intercourse of his mind with other literati of the age, and by his attempts against a one-sided nationality and a speculative deviation from the original doctrines of Christianity, as from mysticism and Jesuitism. With these ideas he began in 1825 a theological year-book, called "Drucke aus dem Empire," published from 1825 to 1829, and another journal called "Kirchenbekenntnungen," published in 1827. Among his other numerous writings we may mention "Memorabillen," published in 1791 to 1794; "Sammlung der Merkwürdigsten Reisen in Deutschland und Persien," published in 1782; "Leben Jesu, als Grundlage einer reinen Geschichte des Urchristenthums," 3 vols. 1788; "Aufklär. Beiträge zur Pogemen-Kirchen- und Religions-Geschichte," 1800; "Exegetisches Handbuch über die dreie ersten Evangelien," 3 vols., 1830 to 1833; ("Keizerichs" Geburts- und Lebens-Geschichte, zum Andenken an sein fünfzigjähriges Jubilrium, 1839; and the "Vorlesungen Schelling's über die Odenbarung," accompanied with critical remarks. Few men have had a wider influence upon religious opinions in Germany than Paulus; though many of his views have been contested as too rationalistic. In 1844 on account of his great age he was allowed to retire from his situation on a pension, and he died on August 9, 1850, aged ninety.

PAULUS, N. F.

PECULIAR. The jurisdiction of all Royal and other Peculars in the probate of Wills and the grant of Administrations has been transferred to the new Court of Probate. [Cit.]

PECIDELARIA, the name given by Müller to little pincher-rounded bodies found on the surface of many species of star-fishes and sea-urchins. When seen on the surface of the dried specimen they appear like little cleft spines. In Usaster rubens, according to Mr. Sharpey, they cover the surface generally, and are more numerous round the spines. Each one of these little bodies consists of a soft stem, which bears on its summit a little forceps of calcareous matter. If anything is introduced between the blades of these forceps which will act as an irritant, it is instantly converted into a powerful dextrorse forceps. Those on the body and upper spines differ in shape from those on the spines immediately bordering the auries. When the star-fish is living the blades of the forceps are in continual activity, but when cut off they seem to lose that power. These bodies have been observed by Sars in Echinus spharca, and he describes three species—P. tridens, P. trophylla, and P. globifera.

The question of the nature of these bodies has been often agitated. While some have considered them to be parasitic animals, Okon, Sharpey, and Sars regard them as organs of the animal. Sars assigns the following reasons for his belief:—

1. The calcaraceous forceps and stems to which they are attached, bear structurally a greater resemblance to the spines of Echinochordata than to other structures.

2. The Pedicellariae have a vital connection with the skin and shell of the Echinus. The stem of the Pedicellaria is attached to a knob of the shell of the Echinus, on which it moves.

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4. Sars states that when a single Pedicellaria is irritated, the rest are induced towards it.

Although Professor E. Forbes states that he was not able to confirm the Sars view, and that he used to imagine that the pedicellariae was not peculiar organs of Echinodermata, rather than parasitic animals.

(Forbes, British Our-Fish.)

PEDIANTHUS, a genus of Plants belonging to the natural order Euphorbiaceae. It has a common slipper-shaped involvulus. The male flowers several in the circumference. Pedicell bracteolate, each articulated with a naked stem. Female flowers one in the centre. Calyx wanting; style 1; stigma 3; capsules 3.

P. titylumeloides, Jew-Bush, is found in various parts of the West Indies in stony bushy places, near the coast. It is a shrub throwing out runners, erect, about six feet high, bearing, when young, a large white bloom, and numerous many-seeded, weak, soft, as thick as the finger; when old cinereous, when young green. The leaves are ovate, oblate, or acute; corollae, entire, alternate, stalked, dishaceous, when young downy on each side, and wavy at the edges, becoming at last cleft, entire, and discaceous; the ovary covered with papillates, scented with the extremities of the branches. Involucr slitem-shaped, bright red with a green back. The practitioners of Carapa give a decoction of the whole plant, especially of the stem, as the ordinary beverage, and in large doses in some diseases.

PEEL, SIR ROBERT, the second baronet of the name, was born on the 6th of February, 1778, near Bury in Lancashire, the eldest son and third child of the first Sir Robert Peel. He succeeded his father at the age of twenty-one to the House of Commons as member for Caen. His father had destined him for a political career, and from the time of his first entrance into Parliament he was placed in a position of absolute independency, and his father's position out of his income equal in amount to the fortune of many a nobleman.

On entering Parliament Mr. Peel attached himself to the Tory party, to which his father already belonged. Peel never had any great political ambition, and was content with the situation of his father, and with the most powerful coadjutors; while on the Whig benches sat Sheridan, Tierney, Whitbread, Horner, Brougham, Romilly, and Sir Frances Burdett. The elder Peel had made no secret of the great expectations he entertained of his son's success in Parliament; and in his young man's first steps in the walk of life for which he had been carefully trained, were looked at with much interest and with some jealousy. But Mr. Peel was prudent, and was in no haste to measure himself against the established orators of the House. His father having stepped down, Mr. Peel was seconded the address at the opening of the session. His subsequent votes and speeches gained him the reputation of a steady and able young man, from whom much might be expected; and, on quitting the university he took what was then (the modern examination system having been but recently introduced) the unprecedented honour of a double first-class—i.e. of paramount excellence both in classics and in mathematics. He had scarcely left college when, in 1800, at the age of twenty-one he was returned to the House of Commons as member for Caen. His father had destined him for a political career, and from the time of his first entrance into Parliament he was placed in a position of absolute independency, and his father's position out of his income equal in amount to the fortune of many a nobleman.

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The Earl of Liverpool became premier with Lord Castlemere as foreign secretary, Lord Sidmouth as home secretary, Lord Eldon as chancellor, and others of the seniors of the same party in other places of the cabinet; while among the ministers out of cabinet, Mr. GRATTAN, as speaker, the Duke of Richmond as lord-lieutenant of Ireland, and Mr. Peel as chief secretary for Ireland. The post accepted by Mr. Peel in this ministry, stationing him as it did in the midst of the tempestuous sea of Irish politics, was not new to him; among his predecessors in 1806, 1811, and with the union of 1800 had not yet subsided; the agitation for Catholic emancipation was fiercer than ever; and Mr. O'Connell had just become the leader of the Irish people, and was singling out objects against which to direct the full force of his oratory. The new ministry was identified with the anti-Catholic policy of the existing ministry; he was nick-named 'Orange-Peel;' and Mr. O'Connell seemed from the first to conceive an implacable hate to him personally. Various manifestations of this animosity, Mr. O'Connell in May, 1815, attacked him in one of his public speeches in terms so directly insulting that a challenge was the consequence. Some delay however having occurred in settling the preliminaries, the duel was prevented. Mr. Peel turned out to be a man of the blackest blackguardism by one party and to infidelity by the other; and by the diligence alone with which he sought to remedy the multifarious aches and total want of order which existed in the details of his own office, did he gain credit in Ireland with either party. In all else, for his party as well as for the empire, he was too much of a nonentity. He was too timid, and by the influence alone, to object to the reform of the church and the resignation of the secretaries having sufficed; and the people, the faction answered, their king, and the Catholic party, parce l'amour.

Meanwhile however he acted consistently with his position as Irish secretary under the Liverpool administration. Not only did he oppose Mr. Grattan's motion for a committee to consider the Roman Catholic claims in February, 1813, and again Sir Henry Parnell's motion on the same subject in 1815, but his speeches on both these occasions were the shrillest that he had yet delivered, and among the most telling on that side of the debate. The common charges against the decision of the practice of the House of Commons, having retired into the Upper House as Lord Colchester, and a vacancy having in consequence occurred in the representation of the University of Oxford, Mr. Peel was elected his successor (1818). Mr. Canning was inspired to the honour; but the influence of Lord Eldon, and the conviction entertained by the university of the orthodoxy of Mr. Peel's views on the Roman Catholic question, determined the choice. Mr. Peel then, greatly to the regret and astonishment of the more far-sighted of his party, strongly opposed the bill, and resigned his seat. It was during this period, too, that the leading part he took in the pressing currency questions of the day, he laid the foundation of his subsequent fame as a financier. He had already shown his sympathy with the views of what was then called the Catholic party, of which Mr. Horner during his life had been the head, and to which the House about this time received a powerful accession in Mr. David Ricardo; and on the appointment of a select committee in February 1819, to consider the question of the remuneration of the public officers, a payment was rendered necessary by the commercial distresses attending the transition from a state of war to one of peace, Mr. Peel, then only thirty-one years of age, was appointed chairman, having been a member of the committee of 1807, and of Sir John Robinson, Sir James Mackintosh.

In the proceedings of this committee and the debates which arose out of them, Mr. Peel displayed his ability both as a speaker and as a man of business; and it was in May 1819 that, with a future salary of £5,000 a year, and by cash-payments, he constituted himself the champion, to see his own words, of "the old, the vulgar doctrine, as some called it, that the true standard of value consisted in a definite quantity of gold bullion;" Every sound writer on the subject," he said, came to the same conclusion, that a certain weight of gold bullion, with an impression on it denoting it to be of that certain weight, and of a certain fineness, constituted the only true, intelligible, and adequate standard of value; and when, in the further effect by parliament, there were not wanting members who despaired of them; and among these was Mr. Peel's father, Sir Robert. Besides this currency question, the further history of which we need not trace, Mr. Peel in the same year took part in the Liverpool government in their opposition to the then revived agitation for Parliamentary Reform. He approved of the famous 'Six Acts;' and—what was long afterwards remembered by the other party to his discredit—was defended, with a vigour all the more remarkable, that he was not called upon to exhibit it by any official connexion with government, the conduct of the magistracy in the so-called 'Manchester massacre' of August 1819. He kept aloof however, with studious caution, from the ministerial proceedings of Queen Caroline, which followed the demise of George III. and the accession of George IV. to the throne (January 29, 1809), and which were terminated by the queen's death in August, 1811. It was in the midst of this storm of matrimonial politics that Mr. Peel himself married. His bride was Julia, the youngest daughter of General Sir John Floyd, Bart. The marriage took place on the 8th of June, 1830.

George IV. having retained the Liverpool ministry in office, Mr. Peel was induced again to become a member of it. In January, 1822, he took office as secretary of state for the home department. A further modification of the ministry was caused by the suicide, in August, of Lord Castlemere, whom Mr. Canning succeeded in the foreign secretariatship. The new foreign secretary was the first to turn the head of the government. It was he who took up this ministry, Mr. Canning and Mr. Peel continued to be the most prominent and active members of it—agreeing sufficiently to co-operate, but having at the same time the most certain different views. The position of the foreign policy of the country, Mr. Peel was busy with new forms of the currency-question peculiar to a time of unusual commercial distress and panic. While Mr. Canning was favourable to a consideration of the Roman Catholic claims, Mr. Peel, as before, opposed them, though with a growing conviction that the opposition could not be long continued. Both remained opposed to parliamentary reform. Prior to the time of Lord Liverpool's resignation his ministry was broken into two parties. Mr. TORY or EVEN-PEEL, was that which opposed the Roman Catholic claims, and of whom Mr. Peel was the active leader; and the liberal party, who, with Canning as their leader, were approximating to the Whigs. The question, on Lord Liverpool's retirement, was the state of the finance. The appointment of a nobleman of high rank and influence, such as the Duke of Wellington, to succeed him, the two parties could be held together, or whether a new ministry should be formed of which Canning should be the head. The second government was the answer. A new ministry was formed, though personally hostile to the Roman Catholic claims, empowered Mr. Canning to form a ministry in which the Roman Catholic question should be an open one, but which should pledge to the observance of the resolutions of the Tees and Corporation Act. In this ministry, the formation of which was regarded as a new epoch in the political history of the country, and was accordingly welcomed by many of the leading Whigs, Mr. Canning held the Chancel-
lorship of the Exchequer together with the premier's usual offices of Lord High Treasury and Lord Privy Seal, on the administration caused by the secession of Lord Eldon, Mr. Peel, the Duke of Wellington, Lord Melville, and others, were filled up by the selection of men willing to act along with Mr. Canning—among whom was Mr. Robinson (now called Sir Alexander); but on his resignation, in January 1828, a new ministry was formed of the old Tory construction, with the important and significant exception, that Lord Eldon was not re-instated in the position he had filled in it. The following was the composition of the cabinet of this memorable administration, which, from the names of its two chiefs, is now usually called the Wellington- Peel Administration:—First Lord of the Treasury, the Duke of Wellington; Chancellor of the Exchequer, Mr. Goulburn; Lord Chancellor, Lord Lyndhurst; President of the Council, Earl Bathurst; Lord Privy Seal, Lord Ellenborough; Foreign Secretary, Lord Dudley and Ward; Colonial Secretary, Mr. Huskisson; Home Secretary, Mr. Canning, then in the Mint, Mr. Herries; President of the India Board, Lord Minto; Board of Trade, Mr. Grant; Secretary at War, Lord Palmerston. The ministry was afterwards modified by the secession of Mr. Huskisson. Its great act was the passing of the Catholic Relief Bill—a great event, the necessity of which Mr. Peel had been prepared for; which was now pressed to an issue by the overwhelming influence of the Catholic Association in Ireland, as shown in the election of Mr. O'Connell to the House of Commons for the county of Clare, the result of which, it was announced on as soon as his election was known, had given his reluctant consent. On the 6th of March 1828, Mr. Peel—who had in the meantime been rejected by the University of Oxford in favour of Sir Harry Inglis, whose appointment to the same principle he sought forward the Relief Bill in the Commons, as member for the close borough of Westminster. His speech on this occasion was not only powerful at the time, but is interesting now as revealing what may be called the cardinal principle of Mr. Peel's career as a statesman. "We are placed," he said, "in a position in which we cannot remain. We cannot continue stationary. There is an evil in divided cabinets and distracted councils which cannot be longer tolerated. Supposing this to be established, and supposing it to be conceded that a united government must be formed in the nation, I say that government must choose one of two courses. They must advance or they must recede. They must grant further political privileges to the Roman Catholics, or they must make their demands by force. I have been, and now is, a new light has broken in upon me? Why do I see a necessity for concession now which was not evident before? The same events, I am told, have happened before, and therefore the same consequences ought to follow! Is this the fact? Are events in politics like equal quantities in numbers or mathematics, always the same? Are they, like the great abstract truths of morality, eternal and inviolable in their application? May not the recurrence—the continued recurrence of the very same event—nearly alter its character, at least its practical results?" Mr. Peel on this occasion spoke out, as a statesman, the general sense of the nation; and the Emancipation Act, after running the gauntlet of the Upper House, became law. Besides this great measure, Mr. Peel, as Home Secretary, introduced the New Metropolitan Police Act, which provided London with its efficient body of 'Peelers,' subject to the Home Office, in lieu of the old 'Charlies.' Questions of currency also occupied him during this administration. Though the Wellington-Peel government had yielded on the Roman Catholic Relief question, they were not prepared to yield on the great constitutional question of Parliamentary Reform. When, in February 1830, Lord John Russell moved the question of disfranchising the corrupt boroughs, and transferring the representation to some of the large commercial towns then unrepresented, Mr. Peel opposed the motion, "because it introduced a principle into the system of government that of numerical majority—which he said was the ultra-democratic principle, and at war with the aristocratic and monarchical principle could not long coexist." The death of George IV. however (June 26, 1830), and the accession of William IV., followed as it was by an immediate dissolution of Parliament and a general election (not to speak of the concurrent influence of the French Revolution of July), rendered the continued refusal of Parliamentary Reform impossible. After the re-assembling of Parliament on the 2nd of November 1830, the Duke again repe- }

...
and irreproachable settlement of a great constitutional question—a settlement which no friend to the peace and welfare of the country, or to the force of popular opinion, could view insidiously.

Proceeding on this as a fixed principle, the new ministry was to govern the country in a Conservative spirit, but with a readiness to carry into effect certain minor domestic reforms which were indicated. This point was met in the Reform Bill. The remnant of the old Tories, who were not satisfactorily to the country at large. The Reform Bill had not, indeed, produced all the results that the more eager had anticipated; the Whigs had not, as was generally expected, popular support, and the disappointment had begun to show itself among the Radical party, who criticised the Whigs severely and were bent on carrying further constitutional changes. Still, the re-action against Whig rule was not yet gained. Sir Robert Peel and his followers could stand its ground. This was shown by the result of the elections which followed the dissolution of Parliament—a dissolution thought necessary by Sir Robert himself. As soon as the new Parliament met, government was defeated by a majority of 618 to 306 on the election of a speaker—Mr. Abercorn, the nominee of the Whigs (now Lord Darnifold), being chosen instead of the former speaker, Sir Charles Sutton. This was on the 19th of February 1835; and on the 29th the Whigs were defeated in the Commons by a majority of seven, on a motion by Lord Morpeth for an amendment on the address. Sir Robert's speech on this occasion was extremely able. Singing out the fact that the strength of the opposition to him and his followers was not only increased by Irish members with the Whigs, he animadverted in cutting terms on this conjunction, seeing that in point of fact the Irish party and the Radicals had been far more unfriendly to the downfall of Whig ministry than he and his followers; and, seeing also that even now the Whigs did not pledge themselves, any more than he did, to the ballot, the exclusion of bishops from the House of Lords, the repeal of the Corn Laws, or any other of those measures upon which the Radicals had been so constant in their denunciations, the result was, that a Whig ministry could not really be a whit more innovative than his own would be. The answer to this given at the time, says Mr. Doubleday, was "that the Whigs would be more 'squeamish' than the Conservatives;" and, accordingly, though Sir Robert remained in office, showing wonderful patience and wonderful practical talent, till April, he was then defeated by so considerable a majority, in a skillfully framed series of motions of Lord John Russell's, relative to the temporariness of the Conjectural Bill, which he had not introduced till April 6th, 1835. Lord Russell was again placed at the head of a Whig administration, consisting of nearly the same men who had been in office four months before, the chief exception being that in the intermediate period Sir Robert Peel had resigned the Whigs and Lord Brougham, so that the chancellory was given not to him but to Lord Cottenham. Lord John Russell became home secretary.

The second Melbourne administration lasted throughout the rest of the reign of William IV. (who died June 20, 1837) and during nearly four years of the reign of Queen Victoria. During those six years (1835-1841) though many questions were agitated, their chief success was in the Municipal Reform Bill, passed during the first year. From 1836 to 1839 they were able to do little, and, robbed of their strength as they were by the growth of the more extreme party and of the party who desired a repeal of the Corn Laws, they were becoming more and more unpopular. At last Sir Robert Peel, whose popularity had been in proportion increasing, and who had in the meantime been acting as a critic of their measures, and husbanding his own strength, opposed their bill for suspending the constitution of the Colony of Jamaica; and the majority of the opposition was at once against it. Sir Robert was called upon to form a new ministry. In this he failed, owing to the refusal of the queen to consent to the removal of the office of Lord Chancellor from the hands of the Whigs. Sir Robert Peel was inconsistent with their holding official place under a Conservative government. The Whigs accordingly resumed office, and kept it for more than two years longer—weakened, as before, by the pressure upon them of Mr. O'Connell's party, and the Anti-Corn Law League on the one hand, and of Sir Robert Peel and his well-drilled Conservatives on the other. A general election in 1841, instead of giving them fresh strength, so increased the Unionists who were their bitterest foes that Sir Robert Peel had a majority of 360 against 269 in the Commons on a motion for an amendment to the address so framed as to involve a vote of want of confidence in the policy of ministers, more especially their policy on the Corn Laws. This minute reference to the Corn Laws (Aug. 27, 1841). Three days afterwards Lord Melbourne and his colleagues resigned, and Sir Robert Peel was once more premier. The new Conservative cabinet consisted of the following ministers:—First Lord of the Treasury, Sir Robert Peel; Lord Chancellor, Lord Lyndhurst; President of the Council, Lord Wharncliffe; First Lord of the Admiralty, Lord Haddington; Lord Privy Seal, the Duke of Buckingham; Home Secretary, Sir James Graham; Secretary of State for War, Sir John Russell; Secretary for the Colonies, Sir George Pakington; Colonial Secretary, Lord Stanley; President of the India Board, Lord Ellenborough; Secretary at War, Sir Henry Harden; President of the Board of Trade, Sir Thomas Gascoyne; Chancellor of the Exchequer, Mr. Goulburn; Paymaster-General, Sir Edward Anstis. Among the ministers not in the cabinet, was Mr. W. E. Gladstone, as Vice-President of the Board of Trade. At the head of this ministry, and with the command of a working majority of 265 out of a house of 652, Sir Robert Peel entered on the greatest period of his political career. The history of his ministry from August 1841 to July 1846 is full of interest. Having committed himself to no definite line of policy, except in his preference for a sliding-scale tariff, he was accepted by the country, on his accession to office, was left to form its own auguries and anticipations. Nor during the remainder of the session of 1841 would he bring forward any explicit statement of intended measures—resolved, he was to mature them during the prorogation. On the re-assembling of parliament in February 1842, he was prepared with his measures. They were of a bold and comprehensive character. First, in the matter of the Corn Laws, he proposed to repeal the duties, according to which the duty on foreign corn, commencing in the case of wheat at 20s. per quarter when wheat was at 50s., should gradually diminish, as the price rose,—becoming, for example, 17s., when wheat was at 55s., 11s., when wheat was at 60s., 8s., when wheat was at 70s., and only 1s. when wheat should be at 72s. or upwards. There was a corresponding scale for oats and another for barley. The measure, displacing as it did the old duties, was on various grounds attacked; and, because they had declared for a fixed duty, to the Anti-Corn Law League, because they desired a total repeal, and to many of the landed proprietors, because they disliked any relaxation of protection—croused much discussion; but after a severe moral, it was defeated, and, as the measure was rejected, it became law. Next came the important question of the means of repairing the deficit which had been going on in the revenue, at such a rate that the total for the five years ending April 5, 1842, was 7,529,635l., while in the year 1842-43, it was calculated by anticipation at 2,670,000. On this head, says Mr. Doubleday, Sir Robert argued "that the maximum of indirect taxation was then reached, and that to accumulate the already unbearable load of duties upon the necessary or even the luxuries of life would be ruinous as well as futile. The conclusion, therefore, was that nothing but a direct tax upon income could be relied upon to fill up the hiatus in the exchequer." Accordingly it was proposed to levy for three years an income-tax of sevenpence in the pound payable by men over 25. This also, in spite of opposition, was carried. Then came the reversion of the tariff, by which the premier abandoned the duties on a great variety of minor foreign commodities, such as drugs and dyes and dyewoods; and diminished the prohibitory duties on cattle, sheep, pigs, salted meat, butter, eggs, cheese, and lard. Though the new tariff was also carried, it caused dissension between Sir Robert and many of his Protectionist supporters; the more so, in the course of the debates a new principle was put forward, that the rule of the cheapest market and sell in the dearest." This statement drew rapturous cheers from the economists and
opposition generally; and though Sir Robert went on to say, that he deemed corn and sugar exceptional cases, the anterior tendency was evident. With the exception of some debates on the poor-law, and some on foreign policy in reference to France, Spain, America, and China, the foregoing measures of legislation and finance engrossed the parliament of 1842. The most important events of 1843 were extra-parliamentary. The permission of the disruption of the Scotch established Church in May 1843 has been accounted by some a moderate step towards greater religious conformity with the principles of conservatism, and has been attributed to false or insufficient information on the part of government. The contest with Mr. O'Connell, who was then agitating Ireland to the verge of revolution by monster-meetings and the organisation of the United Irishmen, was peculiarly of a kind to occupy a greater share of the energies of the government. For a time Sir Robert, confident, as it afterwards appeared, that Mr. O'Connell himself did not mean to be a candidate for a certain length, allowed him to proceed without check; but at length (October 1844) the government took their measures, the Clontarf meeting was forbidden, and Mr. O'Connell, his son John, and seven of their associates, were arrested on charges of conspiracy and sedition, and, being tried, were sentenced to fine and imprisonment. From that moment, although the sentence was reversed on appeal to the House of Lords, Mr. O'Connell was virtually crushed; he was never able again to be what he had been.

The year 1844, with its Bank Holiday, the Chartist riots, and the Marat affair, had passed away; and 1845 opened with every outward show of prosperity. The parliamentary session of that year was comparatively easy; the renewal of the income-tax for three years longer, the assessment of the boroughs, for the purpose of facilitating the presentation of six new Irish colleges, open to all sects, were carried by government; and though the Anti-Corn-Law League, represented in the House by Messrs. Cobden and Bright, were making way, and were gaining over the Whigs, the stability of the existing administration was not materially affected. But the events of the long recess of 1845 were of a kind to disturb all existing arrangements and all ordinary calculations. The potato rot, followed as it was by a dreadful famine in Ireland, rendered it impossible for the government to come to some conclusion on the great question which the Anti-Corn-Law League had been maturing. Lord John Russell announced this in his famous letter of the 22nd of November, written from Edinburgh, to the electors of London.

Sir Robert Peel lost no time in declaring to his colleagues that the Corn Laws must be totally repealed. In this Lord Stanley and others would not go along with him; and on the 6th of December, Sir Robert advised the queen to send for Lord John Russell. As Earl Grey refused to join with Lord Stanley, Lord Stanley resigned, and Sir Robert was recalled after a few days, and re-accepted office at the head of his ministry (Lord Stanley succeeding) with the avowed intention of repealing the Corn Laws. Accordingly, a corn law commission of parliament was appointed, he brought out a new tariff, and with it his proposition to modify the action of the sliding-scale for the next three years, and after that period to abolish all duties on corn, except the nominal one of a shilling per quarter. Vehement debates followed, in which Lord Stanley, Lord George Bentinck, and Mr. Disraeli, as the heads of a new Protectionist party, attacked Sir Robert with every weapon of sarcasm and argument. The Duke of Wellington however, and other Conservatives of great weight, remained firm to their leaders; and the repeal was carried. Defeated on the Irish Coercion Bill, only a few hours after the Tariff Bill had passed the Lords, Sir Robert resigned office (June 30, 1846). Before doing so he made a magnanimous declaration to the effect that the merit of the repeal of the Corn Laws was more to Mr. Cobden than to himself, or to any other man in the House. Never perhaps was a minister followed into his retirement with such general assurances as followed Sir Robert Peel. His popularity continued unabated during the next four years. During two of these he lent a general and cordial support to the Whig government of Lord John Russell—voting with them on the question of the Navigation Laws, and the most important of all, the Reform Bill. The European revolutionary movements of 1848-49 however, brought in a new set of questions, and Sir Robert disagreed seriously with the foreign policy of Lord Palmerston. Anticipations were general of his speedy return to power when, riding up Constitution-bill on the 29th of June 1850 he was thrown from his horse, and injured so severely that he died on the 2nd of July.

This is not the place for any attempt to appreciate Sir Robert's character as a man and a statesman. Many reviews of his career, some in the form of elaborate biographies, have been published since his death—among which may be mentioned 'The Political Life of Sir Robert Peel, by Thomas Doubleday, 2 vols., 1856; and M. Guizot's more recent work 'Life of Sir Robert Peel, a biographie historique,' published 1861, 2 vols., which contains many valuable and interesting letters and papers, referring particularly to his conduct in the Roman Catholic Emancipation movement, and in the Corn Law Repeal movement, have also been published by his literary executor. Almost all who have written about him have been disposed to view him as a moderate statesman, of sounder. conscience, and of a species of ability peculiarly English and peculiarly fitting him for the work which fell to him—ability not of the speculative or philosophical, but of the practical, deliberate, and considerate order. His political genius consisted in perceiving when the necessity for carrying a great social change arose, and in devising the parliamentary means for carrying it. As the leader of a party, and as a master of the art of parliamentary management, he was probably unrivalled; the House of Commons was his element; and though there have been greater orators there, there have been few speakers combining such dignity, tact and courtesy, with fine powers of eloquence. Apart from his parliamentary work, he extended his pleasures by certain of a pecuniary nature, partly by himself, who did not himself practise authorship except in connection with practical politics, were high and scholarly, and more wide in their range than might have been supposed.

Sir Robert left five sons—the present baronet, Sir Robert (born May 4, 1825); former Lord Mayor of London (1860); two daughters, one married (1841) Viscount Villiers, eldest son of Earl Jersey; the other married (1855) the Honourable Mr. Stonor.

PEERS OF THE REALM. In the case of Lord Wensleydale, to whom a barony had been granted for the term of seven years and not subject to entail, his successor was appointed a peer of the realm, by a refusal on his part to accept such a grant did not constitute the grantee a lord of Parliament; in other words, that hereditary peerage alone entitled the holders to a seat in the House of Lords.

PELLICULAE [Minoisolae, S. 1.] PELARGONIC ACID. [Chemistry, S. 2.] PELLICO, SILVIO, was born in 1759, at Saluzzo, in Piedmont. His father was Onorato Pellico, of a respectable family, and in good circumstances. His mother was a native of Chambery in Savoy, who, retaining her native name in marriage, married Michael Le Pellico-Tournier, who was the son of Luigi and Gio- sefina, the two eldest; Silvio and Rosina, twins, followed; Francesco and Margherita were next in succession. Two daughters married, one of which was married to her husband's brother, and the other to her husband's brother's son. Onorato Pellico, while his children were yet young, having established a manufacture for winding silk at Pinerolo, resided there some time; but removed to Turin, where he was appointed to a situation under the govern-
ment. There Luigi and Silvio were instructed in Latin and Greek, and other branches of education, by Don Manavella, a clergyman. Onorato Pellico, who had a taste for poetry and the drama, wrote scenes and short plays, which were performed by his children and others of a similar age, on a small stage constructed in his father's house. Luigi afterwards became a dramatist, as well as Silvio.

Silvio Pellico's twin-sister Rosina, who is described as having been extremely beautiful, was married at the age of eighteen to a cousin by the mother's side, who was prosperous, and they had five children. Silvio Pellico-Tournois, with his sister Silvia, accompanied the bride to the residence of her husband. The mother after a short stay returned home, but Silvio continued to reside with his sister's husband during four years. While on tour in 1807 Ugo Foscolo, who was the Meinheimer of Silvio Pellico's contract ("La Ermodice") was published, and was sent to him by his brother Luigi. The reading of it excited him greatly, and stimulated him to the prosecution of his poetical studies. Meantime his father had changed his situation under the minister of Milan, and had removed to that city with his family. His brother Luigi was secretary to the Marquis Caprara, grand equerry of the kingdom of Italy.

Silvio Pellico returned from France in 1810, and went to Milan to enter the Collegio degli Orfani Militari, an institution which required two or three hours of the day. The rest of his time was devoted to his poetical studies and to the acquisition of the German and English languages. He became acquainted with Ugo Foscolo, who resided in the same city, and of whose most important work of Italy and with many distinguished foreigners, among whom he himself mentions Madame de Staël, Schlegel, Davy, Byron, Hobhouse, and Brougham. After the fall of Napoleon I, Onorato Pellico returned to his native land, and with the most lucrative offer of France, and having been converted to the Catholic faith, he became a tutor. In 1818 Silvio Pellico published his first dramatic piece, the tragedy of "Laodamia," which was followed by his tragedy of "Francesco, da Rimini," founded on a well-known passage in the 5th canto of the "Inferno" of Dante. This tragedy was much admired, acted with great applause in the principal cities of Italy, and established his reputation as a dramatic poet. Byron translated it into English verse, but did not publish it, and Pellico translated Byron's "Manfred" into Italian prose. He was desirous of publishing his next tragedy, "Esemio da Messina;" but so many passages were objected to by the censorship that he sent it to Turin, where it was more favourably received, and published at Milan, but was not allowed to be acted. In 1818 Silvio Pellico was the chief agent in establishing a periodical entitled "Il Conciliatore," of which he became the secretary. It was mainly of a literary character, and Silvio Pellico, Manzoni, and similar literary men, were the chief contributors; but it was of too liberal a tendency to be endured by the Austrian government, and was suppressed.

On the 13th of October 1850 Silvio Pellico was arrested, and was confined in the prison of Santa Margherita at Milan. He seems to have become a member of the revolutionist society called Carbonari, but does not say so. He was transferred thence to a prison on the island of San Michele, near Venice; and while there was tried at Venice, found guilty, and condemned to have his ear removed. He was permitted to remain in prison until after the expiration of the first term, and was then allowed to go to Turin, but was not allowed to be acted. In 1822 he was removed to the prison of Spielberg, near the city of Brünn, in Moravia. Some of those sent to this prison are condemned to the "carraro duro" (severe imprisonment), and some to the "carraro dolce." In 1830 and occasionally for Silvio Pellico says—"Those condemned to the "carraro duro" are obliged to labour, to wear chains on their feet, to sleep on bare boards, and to eat the poorest food. Those condemned to the "carraro dolce" are allowed to walk without chains with a hand of iron round the waist, the chain being fastened in the wall, so that they can walk only just by the side of the boards which serve them for a bed. Their food is the same, though the law says only bread and water." In the next few months, he was treated with indulgence by his jailer, and read the Bible, Homer in Greek, Dante, Petrarch, Shakspere, Byron, Scott, Schiller, Gütte, and other writers, and was allowed some paper, and pen and ink. His friendly jails having been removed to another situation, during the whole of the years 1824-25-26-27 his imprisonment was excessively severe, and his health was much injured. His imprisonment towards the less stringent, and on the 1st of August 1830 he received the permission to return home in the capacity of a "carraro dolce." This promise was soon afterwards performed, and he returned to his parents at Turin. In 1831 he published the account of his imprisonments, entitled "Le Mie Frigiones," which has been translated into English, and again into Italian, and translated into the principal languages of Europe. It is written in a style of great simplicity, with much apparent truthfulness, and is very interesting. In 1832 he published at Turin "Tre Novelle Tragedie," which were "Gismonda da Mandriva," "L'oppio & Erodiade," and "Tommaso Moro." His mother died in 1837, his father in 1838, and his brother Luigi in 1841. In 1837 he published the "Opere Inedite," 2 vols. One of his latest works was a treatise in prose, "Dei Doveri degli Uomini," "On the Duties of Men." During his later years Silvio Pellico was secretary to the Marchesa Barola, and he died at her villa of Moncalieri, near Turin, January 1, 1854.

PEN, a small natural order of Perigynous Exogenous Insects. The males are large, with imbricated ex stipulated leaves. The flowers are apetalous, the ovary composed of four carpels, the calyx tubular. Lindley places this order in his Rhamnaceae, and points out its relations with Proteaceae and Dracaceae. The species are mostly natives of the Cape of Good Hope. A violaceous sweetish nauseous gum-resin, called Sarcocoll, is produced by various species. This substance contains a peculiar principle called Sarcoceollin, which is converted into oxalic acid by the action of water. Although Dr. Lindley has named this plant Sarcocolla, it has also been called Endlicheria, if this order really produces Sarcocoll at all; and suggests that it is produced, as Sagapenum and Galanhum, by a species of the order Umbellifere. The genera are Ficus, Sarcocolla, and Genus. There are 21 species.

PENOFIS. [Yorkehill.]

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Pellicina (Forbes) has an irregular oval body, arcaned with five rows of distant suckers, those below being always bent; tentacula ten; dental apparatus short, truncate; no gizzard.

P. brevis, of Forbes and Goodrich, is the only species. It was discovered in the Shetland seas, adhering to the stems of Lamarnia, a small water plant. "Tentaculata. It is about half an inch in length, of an oval form, with both its extremities bent upwards. The body is pinkish-white, with minute papillae. The tentacula are long, pedicled, and digitate at the extremity. It is sluggish in its movements, but its tentaculata freely.

Cucumaria has the body regular, more or less pentangular, with five longitudinal rows of approximate suckers; ten tentacula; dental apparatus composed of nearly square plates.

The species are called Sea-Cucumbers. They are the most typical of the Holothuriidae, and their popular name is very expressive of their usual form. They have all of them the power of changing their shape, so that sometimes they are large and oval, at other times they are very long, and sometimes they are round. They usually live, among sea-weeds or in mud, and are supposed to seize their prey by their large tentacula. They are found very generally throughout the seas of the globe. The following are the British species described by Professor E. Forbes in his "History of the Cucumaria." -

C. frondosa (Holothuria frondosa, Gunner), the Great Sea-Cucumber. It has been principally found off the coasts of Scotland.

C. pentactes (Holothuria pentactes, Müller), the Angular Sea-Cucumber. It has been taken on the coasts of Devonshire and Dorsetshire, and is found in the seas of France and Norway.

C. communis, Common Sea-Cucumber. Great numbers of these animals have been observed off the coast of Fife, and being dredged in the north and south of Ireland, by Mr. W. Thompson and Dr. Ball.

3 5
serve its digestive power for ever, unless the fluid became saturated with the dissolved substances, or the conjugated acid underwent decomposition.

(Lehmann, *Physiological Chemistry*, translated for the Cavendish Society.)

PEPYS, WILLIAM HASELDINE, F.R.S., was born in the year 1775, in the city of London, where his father conducted in the Poultry a superior business as a butcher and maker of certain classes of surgical instruments. His early history is a remarkable illustration of the progress of chemistry, and of some other branches of science in this country, as well as with that of the various institutions formed for their advancement. In March 1796 the Askeansea Society (from here, exercise, was established and Mr. Pepys was immediately appointed by the body of managers for the purpose of bringing about any improvement by the discussion of philosophical subjects. Of these Mr. Pepys was one. He became a member of the Committee for Apparatus appointed by the society, and took an active part in the experimental elucidation to the members of facts generally understood, and in the repetition and examination of new discoveries. Mr. Pepys also contributed papers to the same body, which, from the residence or occupation of its members in the city of London, eventually led to the foundation of the London Institution, and, through the British Mineralogical Society, in part also to the establishment of the Geological Society of London, of which Mr. Pepys was an early member and office-bearer. His skill and ingenuity in the construction of apparatus proved most important in the development of chemical and physical sciences in England for a period exceeding thirty years. His researches on respiration, prosecuted in conjunction with Mr. Allen [Allen, William, S. 1], and published in the Transactions of the Royal Society, have established the foundation of our exact knowledge of the chemical changes produced in air by that process; while their preliminary experiments on carbon and carbonic acid, recorded in papers contained in the same collection, confirmed several points in the chemical history of those bodies, which had remained in doubt or been insufficiently examined. In 1808 Mr. Pepys was elected a Fellow of the Royal Society, in the proceedings of which he took an active part for many years.

As just intimated, he was one of the earliest promoters of the London Institution for the Advancement of Literature and the Diffusion of Useful Knowledge, which was founded in 1808 and 1806, with the intention of supplying for the City of London, advantageously combined with those of the metropolis from the establishment of the Royal Institution, a few years before. He is named as one of the managers of the London Institution in the Charter of Incorporation, dated January 21st, 1807, and for many years he continued to be, an officer of the Board, the arrangements for the laboratory, the collection of chemical and philosophical apparatus, and subsequently for the lectures, were mainly carried out by him, and from 1821 to 1834 he was honorary secretary. After an interval of some years he was re-elected a member of the Board, and as president, which office he continued to hold during the remainder of his life. Under his direction a voltaic battery of 2000 double plates of zinc and copper was constructed for the laboratory, with which many of Sir Humphry Davy's experiments on the magnetic phenomena produced by electricity were made, with the personal assistance of Mr. Pepys and other friends. In the 'Philosophical Transactions' for 1825 is described another voltaic battery devised by Mr. Pepys. Mr. Pepys was also a student in electro-magnetic experiments, and constructed for the London Institution, consisting of two plates only, one of copper, the other of zinc, and those each fifty feet in length and two in width, coiled around each other. A remarkable experiment repeated by Sir H. Davy and others in the laboratory, this apparatus was often used to electrify the contemporaries of Davy and Wollaston. He died at his house in Earl's Terrace, Kensington, London, on the 17th of August 1856, at the age of eighty-one.
PERCH. [Perci.] Fish.

PERCUOIDEI. [Percidae].

PERRORAS, an eminent physician and pharmacologist, was born in the parish of Shoreditch, London, on the 22nd of May 1804. He received his early education in his native parish, and was distinguished at school for his knowledge of classics. At the age of fourteen he was apprenticed to Mr. Latham of the City-road, a physician who practised as a surgeon and apothecary. His master having died, he commenced attending on the practice of the Aldersgate-street Dispensary in 1821. At this time his dispensary was recognised by the Apothecaries' Society as one of the institutions to which medical students were admitted to qualify for medical degrees. In 1823 he obtained his licence to fit him for this purpose, and was admitted as a candidate for the Apothecaries' licence. The physicians and surgeons of the dispensary gave lectures, which were also recognised by the Society of Apothecaries. In 1832 he was appointed Surgeon to St. Bartholomew's Hospital, and in March 1832 obtained his licence to practise from the examiners of the Society of Apothecaries. He was not nineteen years old, and the facility with which he obtained his licence, indicates very plainly how small an amount of education was required for the medical man at this time. He was shortly after appointed apothecary to the Aldersgate-street Dispensary, and thenceforward his name was connected with the falling fortunes of this at one time somewhat celebrated school of medicine.

On leaving the dispensary he once established himself as a private tutor or 'grinder' as teachers of this class are technically called. In this capacity he was very efficient, and his early publications all had reference to the wants of medical students. He was at this time still a young man, and his work was at once popular and useful. He published an English translation of the Latin Pharmacopoeia of the London College of Physicians. He also published a collection of Latin precepts, entitled "Selecta et Prescripta," a large number of which have been printed. He devoted much time to chemistry and published "A General Table of Atomic Numbers." In 1825 he became a member of the Royal College of Surgeons. In 1836 he was appointed lecturer in chemistry in the Aldersgate-street school of medicine, and subsequently delivered the course in the college on materia medica. The lectures were the foundation of his great work on Materia Medica and his reputation as a pharmacologist. The lectures were first published in the Medical Gazette, and the matter was subsequently re-arranged and published in two volumes in 1839, under the title "Elements of Materia Medica and Therapeutics." Dr. Pereira's mind was eminently discursive. Even while lecturing on Chemistry and Materia Medica in Aldersgate-street he undertook to lecture on chemistry and botany at the London University, and was successful in this, confiding his lectures largely in writing. He was finally appointed Lecturer on Chemistry and Materia Medica, and his work a produce more scientific and practical than any which had before been devoted to the prolific subject of medicines and their actions.

Up to this time he had practised as a general practitioner; but in 1840 he was appointed Lecturer on Materia Medica, prepared the way for his appointment as physician to that institution. He accordingly in 1840 obtained the degree of doctor of medicine from the University of Erlangen, and was appointed in the same year assistant physician to the London Hospital. He subsequently submitted to the examination of the College of Physicians, and became a London licentiate of that body. He was selected a fellow of the College in 1845. In connection with Materia Medica, Dr. Pereira devoted himself to the Materia Dietetica, and in 1842 he published a treatise on "Food and Diet," which, like his work on Materia Medica, was by far the best that had been published on that subject.

His works brought Dr. Pereira into considerable note as a physician, and the firmness of his practice compelled him to give up his various lectureships. In 1861 he was appointed full physician to the London Hospital. His great knowledge of Materia Medica pointed him out as the most fitting person to fill the next vacant chair at the London University, an office which he held till his death.

Although Dr. Pereira occupied himself more with compiling and arranging the information obtained from others than with original observations, he nevertheless displayed considerable originality, and, as his admirers say, his practice was founded on a sound knowledge of materia medica. He published a series of "Lectures on Polariised Light," and many original papers and observations in the Pharmaceutical and Medical Journals. He took an interest in the formation of the Pharmaceutical Society, and delivered several courses of lectures on Materia Medica in connection with that Society. He was a fellow of the Royal Society and also of the Linnean Society. His death, which occurred in 1853, was sudden, but he had been acquainted with this event to his former teacher, Professor Quennell (of the College of Surgeons, London) on a scientific question, and whilst declining a staircase leading to the Hunterian Museum, made a false step, fell, and ruptured the rectus femoris muscle of both legs. In all probability at the same time some internal injury was sustained by the heart or larger vessels; but as only local inconvenience was experienced, no danger was apprehended; but whilst getting into bed on the 30th of January he felt a violent throb in the region of the heart, and immediately gave notice that a speedy termination of his life was at hand, and this impression was verified within twenty minutes after. A bust was erected to his memory in the London Hospital by his friends.

PERIANS, a n. [Periandria].

PERICLASE, a Mineral, occurring crystallised in regular octahedrons. Primary form a cube. Cleavage in three directions parallel to the face of the cube. Colour obscure green. Hardness equal to felspar. Vitreous translucent. Specific gravity 3.97. It is found in the lava of Vesuvius. Its analysis by Damour gives —

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<tr>
<th>Material</th>
<th>Amount</th>
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<tr>
<td>Magnesia</td>
<td>92-57</td>
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<tr>
<td>Oxide of Iron</td>
<td>6-91</td>
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<tr>
<td>Insoluble Matter</td>
<td>0-38</td>
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PERISTEATION, a genus of Fishes belonging to the Acoutheretopori. With hard body. The body is covered with bony plates, forming a defensive armature. The nasal bone is the P. Malarost, the Mailed Gurnard, was taken, according to Mr. Yarrell, off Plymouth in 1836. It is also a native of the Mediterranean. It is easily known from the other gurnards by its elongated and bifurcated nasal bones. It frequents deep water over rocky grounds, and is generally allowed only at the period of spawning. It swims with great rapidity, occasionally breaking its nose against the rocks. It is fished in the Mediterranean, and as an article of food is in greatest estimation. (Leach.)

PERIWINKLE, a Plant. [Vinca].

PERJURY. A summary power of committing persons guilty of perjury is vested in all the courts of the county by the statute 14 and 15 Vict., c. 100. One object of the statute is to give the prosecutor his costs, when the prosecution is directed by the court. It was passed to meet an expected increase of crimes of this nature, from the parties being allowed to give evidence in their own causes.

PEROVSKITES. [Minerall].

PERKET, S. L. [Perkins].

PERTHES, CHRISTOPHER FRIEDRICH, one of the most distinguished booksellers of Germany, was born April 21, 1773, at Rudolstadt, the capital of the petty German principality of Schwarzburg, whose father was secretary of state in the exchancellorship of the same principality. In 1777, when a boy of fourteen, he was transferred to his maternal uncle, Friedrich Hebel, also a state official of the Prince of Schwarzburg, who, as far as he was able instructed the young Perthes, instilled good principles into him, but little of literature. At the age of twelve he was sent to the gymnasiurn of Rudolstadt, but his previous deficiencies rendered him unable to profit much by the instruction here afforded, a loss which he continued to lament in later life, and which then made great efforts to overcome. At this period he showed great delight in reading and music, and they appear to have had much influence in developing a feeling of self-dependence on his own exertions; and another relation, Lieutenant-Colonel Hebel, the superintendent of public buildings, by taking young Perthes under his protection, gave him a liking for natural scenery. A brother of his father's was a bookseller at Gotha, and this seems to have led to the idea of dedicating Perthes to that trade. In 1786, therefore, he was taken to the great book-selling mart at Leipzig, as a statute apprentice for him. He was, however, dismissed by one because he could not construe one, and by another as too delicate; but one, Böhme, agreed to accept him as an apprentice at the end of another year. On September 11, 1757, he entered upon his new occupation. His master was not kind, but strict; he was employed in the lower and more...
irkson duties of his trade: particularly as a collector; his feet were frost-bitten in the winter; he was confined to his room for nine weeks, during which his master's daughter, Frederika, then only fourteen years old, said, he read to her a translation of Muratori's "History of Italy." He recovered and became fondly attached to his nurse. While serving his apprenticeship his desire for acquiring knowledge was great, but his means were so restricted that he determined to make some temporary exertions. His mother's pension (about 2½ a year), a few occasional presents from his uncle Henbel, and two dollars yearly from his master, formed the extent of his funds, and with these he had to supply himself with shoes and clothes. After he had completed some of the common apprenticeship, James Nissig, was introduced. This associate became a candidate for the affections of Frederika. The rivalry revealed to Perthes that he was in love, and like a true German, he made a confidant of his rival. They agreed to make each attempt to gain her, and that the unsuccessful suitor was to be uncomplainingly to his fate. In 1792, when the French revolution broke out, both uncle and nephew took a great interest in its progress; but Perthes saw and expressed in his letters to his uncle reasons for apprehending danger. His manners appear to have been all his life peculiarly attractive, modest yet firm; and while with Böhme he became acquainted with Göthe, Herder, and Schiller. At the Easter fair of 1793, Hoffmann, a large publisher in Hamburg, having received a letter from his sister, had written to the master released him from his apprenticeship, which had yet a year to run, and he departed with Hoffmann to Hamburg. While here, though sedulously attended to his business, he led a life of his own attachment, and corresponded with his rival, Nissig, who undertook to be a great patron of Frederika, and the state of her affections. His notions of bookselling appear to have far exceeded those of either of his masters. In 1794 he writes: "Where will you find a body of men more deficient in the requisites of information, and so negligent of the duties of their calling, as the booksellers? Germany is deluged with wretched and abominable publications, and will be delivered from this plague only when the world is made rare for honour than for gold." After a residence of about three years with Hoffmann during which he had won the esteem of many eminent literary men, and made great efforts to repair his defective education by study and by intercourse with the numerous French emigrants then in Hamburg, and having received a promise of the reversion of his uncle's business in Gotha, for which he was not inclined to wait, he determined to begin business for himself. This he effected on borrowed capital, and in partnership with his old fellow-apprentice, Nissig. As they were both young and inexperienced they were governed by Frederika Böhme, who declined to marry either, though she owned that she loved both—a good reason, perhaps, for her resolution. Perthes was in despair. He writes, "my whole life was a failure. But he immersed himself in business, in hopes of thus overcoming the defect in his condition, and he succeeded. The partnership with Nissig did not last long, as it was found that, though not unsuccessful, the profits were not enough for two; and he now proceeded on his own account. His acquaintance with literary men extended. Fred. H. Jacob, the Stolberg's, Voss, and Count Reventlow were among them. By Jacob he was introduced to Claudine, the editor of the 'Wandebcker Bote' (Mes- senschrift). When Caroline he married, after a short courtship, on August 2nd of that year. It was a delicate, a retiring woman, possessed of strong religious feelings, and an ardent love for her husband; but his active bustling habits gave her occasional uneasiness, and she would have preferred his being more calm and less worldly. To her gentle remonstrances he replied, "I am persuaded that I am, and must turn to my own wheel, and that of others, with energy." In 1793, with an addition of capital, also borrowed, he entered into the partnership with J. C. Becker, who, from his integrity, activity, and great literary knowledge, was soon considered the most popular bookseller in the business. This went on happily and successfully till 1803, when the French occupied Hanover, placed Hamburg in a state of blockade, and in 1806 occupied the town itself; and the business was released by the peace of Tilsit; it was incorporated in 1810 with the Frankfurt firm; the latter went on, though embarrassed by the Milan and Berlin decrees, and the censorship to which the press was subjected. Perthes had, in his correspondence, lamented the apathy of Germany under the French yoke, and when the French
During the periodical years, there appeared Pestalozzi's works, which had become famous in Austria, especially in Pestalozzi's native Bern, where he was born. Pestalozzi was a poet, and his works, entitled "The Educational Regimental Duties and Labourious Aspirations," became famous both in Bavaria and in his native country. He was a distinguished poet, and his works were considered a great contribution to the field of education.

Despite his physical and mental struggles, Pestalozzi continued his work, and his legacy lived on even after his death. His work was continued by his son, Janos, who took over the responsibilities of his father and continued the work of education.

In the same time, Petofi's Famous Gang was fought for the return of his native country, and on February 20, 1848, his body was found in the grass. The meaning of Petofi's name had changed, and the memory of the young poet, who was also a great fighter, was preserved.

The Slavonic and Exogenous words were associated with the period, and their meanings were changed. The words "Slavonic" and "Exogenous" were used to describe the relationship of the Slavic countries with the rest of the world. The word "Exogenous" was used to describe the relationship of the Slavic countries with the rest of the world. The word "Slavonic" was used to describe the language and culture of the Slavic countries.

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for hostility to the absolutism, as well as by a warm feeling of national independence.

On the 16th of March, it was Petöfi who incited the students of the university to action by reading aloud in the yard of the university his poem of 'Talpja Magyar' ('Hungarians, up!') which was received with shouts of applause; the students of foreign nations, copies, being the first poem printed in Hungary without passing the censorship; and at the theatre that evening, after the great events of the day, it was sung again and again, the whole audience joining in the chorus. His poems, 'Most vagy a fa' (The Tree), and 'Csak a Test' (The Body), had a great influence on the popular mind. He failed however as a candidate for a seat in the National Assembly for Little Kumania, but seized every opportunity of addressing the public to the National Assembly.

When the 1st of August 1848, the two parties of the Moderate and the Extreme Liberals in the National Assembly came to a conflict on the question, if the words of command to the Hungarian army should be given in Hungarian, or as they had always been before, in German. Vörösmarty, who was one of the deputies, gave his vote on the side of the Moderates, who, on that occasion, were first brought into a minority by the party of Kosztbányi. Petöfi, who, only a few months before, had dedicated the collected edition of his poems to Vörösmarty, with a note, 'On this occasion wrote a poetical address to him renouncing his friendship, each stanza concluding with the lines

'I do not hear the Israél from thy brow,
'Tis thy own hand has been it now;'

and in spite of the remonstrances of mutual friends, gave it to the public in the 'c' Elekpekek' ('Pictures of Life'), a periodical he was then publishing in conjunction with Jokai. Soon after he exchanged the pen for the sword, and joined the army of General Miklós and the army of General Dem, who appointed him aide-de-camp. A dispute with General Mészáros, who found fault with the poet's inattention to discipline, induced him to throw up the appointment in May 1849, after being made a captain. The quarrel was between a butcher (the meaning of Mészáros in Hungarian) and a butcher's boy. The approach of the Russians led him to take up arms anew; he again became aide-de-camp to Dem, and shared the last terrible campaign of that spring in Transylvania. After one of the most desperate fights of that period he was seen no more, and it was universally believed that he was one of the slain. His body however was never found, and in 1852 a report was in circulation of his having been found in London and elsewhere, that Petöfi was still alive and in concealment. Six additional years have now elapsed without any tidings being heard of him; his wife has been long re-married, and there seems little probability that he is still among the living. In the first few months of his life, beginning 'Egy gondolat bán engemet,' he expresses a horror of dying in bed, and puts up an ardent prayer for death on the battlefield.

There is a collected edition of the poems of Petöfi up to 1846, in two small volumes, of which a first edition was published at Pesth in 1847, and a second in 1848. Two additional volumes, containing his subsequent works, were seized and suppressed by the Austrian government after the defeat of the revolution of Hungary. Many of them are said to be found in a volume entitled 'Hängök a multbol' ('Sounds from the Past'), published at Leipzig in 1851, of which a German translation by Vaáli and Benkó, with interesting notes, was issued at Brunswick in 1856, under the title of 'Nationallieder der Magyaren.' As the wonderfully didactic elegance of the language is always spoken of as one of the principal charms of the poems of Petöfi, the foreign reader can hardly expect to appreciate them with any approach to the truth of their intention. But there is a lightness and airiness about the songs which make it easy to believe in the effect they are said to produce on the sympathies of an Hungarian reader.

It may be remarked, that though Petöfi has often been spoken of as the blind son of nature, he had, as has been shown, enjoyed ample opportunities of education; and he was in reality well acquainted with the German, French, and English languages and literature. Gyulai, from whose biography of him the most important part of the following is chiefly taken, informs us that in English his favourite authors were Shakespeare, Byron, Moore, and Dickens; and that he was accustomed to call Dickens, from the kindliness which his writings tend to inculcate, a 'benefactor of mankind.' Characteristically enough in a song-writer, he regarded Béranger as 'the world's greatest poet.' His own long poems are very inferior to his short ones; and in prose he can only be considered to have succeeded in reproducing the English of the earlier brothers, and of several rare minerals. In 1823 he discovered that the mineral called uranite was not the hydrated oxide of uranium,
ultimately by brilliant Glasgow, Times whilst Blackwood's his in his "History of Chemistry," forming part of the 'National Library,' published in 1831, when reviewing the progress of analytical chemistry in Great Britain, bore the following honourable testimony to the merits of Dr. R. Phillips—a testimony involving also considerable respect from us as members of the society of science of this country, which thinking men of all ranks perceive to be of daily augmenting importance to the community:—"Of modern British analytical chemists," says Dr. Thomson, "undoubtedly the first is Mr. Richard Phillips, to whom we are indebted for not a few analyses, conducted with great chemical skill, and performed with great accuracy. Unfortunately of late years he has done little, having been withdrawn from science by the necessity of providing for a large family, which has occupied him of this country except by turning one's attention to trade or manufactures."

It was however in the pharmacetical branch of practical chemistry that Mr. R. Phillips's services were most conspicuous, as the confidential function of the editor of this journal of commerce and medicine, in the任职编辑 of the London Philosophical Magazine from 1831, his services were secured as one of its editors, a post he held till his death. The principal articles on subjects of chemistry and mineralogy in the 'Penny Cyclopaedia,' were contributed by him. Mr. Phillips was successively lecturer on chemistry at the London Hospital, at the Government Military College at Sandhurst, at Mr. Grainger's School of Medicine in Southwark, and at St. Thomas's Hospital. In 1839 Mr. (afterwards Sir Henry) De la Beche, who knew that in the first instance chemical investigations of mineral products would be chiefly appreciated by the government and the public, wisely selected him for the appointment of curator and chemist to the Government Museum of Practical Geology in Jermyn-street, an office which he continued to hold till his death, which occurred May 11, 1861, in his seventy-third year, after a very short illness, having been absent from the museum for three or four days only. On the following day, Monday, May 13, the formal opening of the Museum took place, under the auspices of H. R. H. Prince Albert.

On the institution of the Chemical Society of London, in the year 1841, its founder and first president, Mr. R. Phillips bore the honour of being chosen as the first president, his marked likeness to his seniority among English chemists and his distinguished reputation; and although he declined the office they, he became the president in 1849 and 1850. He had been long a subscriber to the 'Philosophical Magazine,' and the 'Chemical News,' and has corresponded with him. He was a kind and helpful friend to many who have become distinguished in science, and who have been enabled to make a comfortable provision. In 1822 the University of Göttingen conferred on him the honourary degree of LL.D.
PHILLYRINE [CHEMISTRY, § 2.]

PHLEGOM, a common name for Moccus. [Moccus]

PHÆLIEA. [CHEMISTRY. § 2.]

PHOSPHATITE, a name proposed for the native Phosphate of Lime derived from organic sources, and usually called Cöppolite. The latter term conveys an impression which is not always wrong, with the part to part of the quantities of the phosphate of lime now obtained for agricultural purposes. In that which is obtained from the Red Crag fragments of bones of large size are constantly present, and it is questionable if any portion of this phosphate has ever been excrementitious and constitutes the component of the detritus of the sea. The more probable origin of these masses seems to be that they are the delir of a huge seapulp of Codæus, sharks, and other animals, which was formed previously to the existence of the beds in which these remains are now found. After which, the animal matter of the bones was gradually washed away, and the large quantities of phosphate of lime found in the water-worn nodules of the Red Crag are thus accounted for. [Cöppolites, § 2.]

PHOTOGRAPHY is both an art and a science. As an art it enables us to draw, depict, or write by means of light. As a science it teaches us how to observe and further to investigate the effects produced by light upon all natural bodies, whether animate or inanimate, mineral, vegetable, or animal. It is comparatively a very new science, having only recently been recognized as a distinct branch of study, and it has already occupied the liveliest attention of nearly all the most eminent investigators in modern science. The names of Davy, Wedgwood, Thomas Young, Wollaston, and others in the last century,而后 of Bunsen, Ritter, Seebeck, Berthold, and Becquerel on the Continent—relate to this effect. Photography is worthy of special attention from the fact that it requires for its rational and thoroughly successful pursuit a knowledge of chemistry, optics, and physics generally, together with an amount of artistic taste and manual dexterity such as must be useful not only for purposes of mental training, but under a variety of circumstances in actual life. The variety of its parts and aims gives it a special charm for those who like to have a pursuit admitting of both activity of mind and muscular activity. It requires no second-external to doors as in close laboratories. Further it has this charm, that while it furnishes problems of the greatest interest and intricacy for the most advanced philosopher in optics or chemistry, it has its practical processes, which may be readily apprehended, and exercised for purposes of utility or recreation by those who are but little skilled in physical manipulations.

The history of photography has been so fully treated of by Mr. Landseer in his Researches into the Art of Photography, and in his Treatise on Photography, and also by the Abbé Moigno, in his Répertoire d'Optique Moderne, that we need not do more here than recapitulate in a brief manner the points of chief interest which they have given at greater length.

In 1799 Peirret noticed that solutions of nitrate of potash and muriate of ammonia crystallized more readily in the light than in the dark. In 1777 the illustrious Scheele writes: "It is well known that solutions of nitrate of silver in acid of nitre, poured on a piece of chalk and exposed to the beams of the sun, grows black. The light of the sun reflected from a white wall has the same effect, but it is much more evident, with white light and white objects. Again, "Fix a glass prism at the window, and let the refracted sunbeams fall on the floor. In this coloured light put a paper strewn with Nano corsa (chloride of silver), and you will observe that this horn silver grows sooner black in the light than in the dark." Senéchel repeated these experiments, and also experimented on the influence of light in the bleaching of wax.

In 1798 Count Remfrod sent to the Philosophical Transactions a memoir entitled "An Inquiry concerning the Chemical Properties that have been attributed to Light."

In this paper the Count attempts to prove that all the effects produced upon metallic solutions by bright sunshine are due to heat. In 1802 Mr. Harrow refused his name, and showed that sodium of mercury were reduced by light alone, and not by heat.

In 1801 Ritter proved the existence of rays in the solar spectrum, which are to be found beyond its visible limits, and which, when they fell on the surface of a body of silver, these researches having excited attention, M. Berard, Seebeck, Berthold, Sir W. Herschel, Sir H. Englefield, Wollaston, Davy, and others, made various experiments which tended still further to confirm the proof that there are additional rays in the solar light which are exercised through its heat; and that the colour of the light was in some way related to this newly observed action of the sunbeam.

Before proceeding to notice the early efforts of those who laid the foundation of the art of photography, with which we are now to be chiefly engaged, we may observe that Priestley, Sénèche, Ingenhousz, De Candolle, Sausure, and Ritter, directed attention to the influence of light upon plants in an interesting and important subject. Others followed in a similar track, still, however, leaving the matter in a comparatively obscure condition. The action of light on the human frame, and on animal life generally, has not yet been fairly investigated. That some special action will be exercised by light on vegetable life and vegetation, is evident, that light will come to be considered as an important element to health as fresh air and wholesome food. It may possibly be that much mental or bodily labour, exercised in the absence of a stimulus of daylight, is directly injurious to animal life. But let us proceed to trace rapidly the art of photography to its source. In the Journals of the Royal Institution of Great Britain for 1803 will be found a paper by "Thomas Wedgwood and Humphry Davy," the first a brother of the famous porcelain manufacturer, the second the Sir H. Davy of a later period. Their joint paper was entitled: "An Account of a Method of Copying Paintings upon Glass and of making Profiles by the Agency of Light upon Nitrate of Silver in solution."

In the following year Davy published a paper which contains the general germs of the photographic art, namely, the application of an optical instrument to impart upon a sensitive chemical surface the images of all natural objects illuminated by the sunbeam, or other source of light. The instruments used by these observers were the camera obscura and the solar microscope; but let us first see how this important invention took shape in the mind of Wedgwood.

According to Davy, Wedgwood first commenced his researches into the art of photography, the camera obscura; and for this purpose, says Davy, "he first used nitrate of silver, which was mentioned to him by a friend as a substance very sensible to the influence of light." This nitrate of silver was applied in solution to surfaces of white paper or leather, and the trace of the light was removed while the plate was slightly moistened with water. Davy quotes the words of the memoir of 1803: "Moistened with solution of nitrate of silver, undergoes no change when kept in a dark place; but on being exposed to the daylight, it speedily changes colour, and, after passing through different shades of grey and brown, becomes at length nearly black. The alterations of colour take place more speedily in proportion as the light is more intense. In the direct beam of the sun two or three minutes are sufficient to produce the full effect; in the shade several hours are required; and light transmitted through different-coloured glasses acts upon it with different degrees of intensity."... "When the shadow of any figure is thrown upon the prepared surface, the part concealed by it remains white, and the other parts being illuminated, may be preserved for ever, or be transferred by the agency of nitrate of silver which has been previously applied, and it is in a high degree permanent. The copy of a painting, or the profile, immediately after being taken must be kept in an obscure place; it may, indeed, be examined in the shade, but in this case the exposure should be only partial. Such a copy, when dry, is in the hands of the common employed, it is not sensibly affected." No means were found to fix permanently the impressions thus produced. And, as regards the primary end of Wedgwood's researches, we are told that "the images formed by means of a camera obscura have been found to be too faint to
produce in any moderate time an effect upon the nitrate of silver." Davy adds, "in following these processes, I have found that the images of small objects produced by means of the camera obscura could be fixed with difficulty on paper.

This will probably be a useful application of the method: that it may be employed successfully, however, it is necessary that the paper be placed at but a small distance from the lens."

The nitrate (chloride) of silver was found to be more sensitive to light than the nitrate. "Even in the twilight, the colour of the moist nitrate of silver spread upon paper slowly changed from white to faint violet; though under circumstances that produced alterations in opaque objects upon the nitrate." Davy concludes with these remarkable words: "Nothing but a method of preventing the unshadowed parts of the delineations from being coloured by exposure to the day, is wanting to render this process as useful as it is elegant.

From this time the art in England slumbered until 1834, when Mr. Fox Talbot, without knowing what had been done, commenced experiments with the same end in view.

But we must now turn to a neighboring country, France. In 1813 M. Niepce, of Chalons on the Seine, was engaged in a task identical in conception with that of Wedgwood. He was endeavouring by means of bituminous varnishes and metal plates to fix permanently the images of the camera, and in May 1816, a portrait of a gentleman and lady were carried out until 1827, in which year he presented a memoir with specimens to the Royal Society of London; but as he kept his processes secret no notice was taken of his labours. Niepce returned to France dispirited. He then had recourse to the method of bitumen on a metal plate, the surface of bitumen laid upon a metal plate, which afterwards engraved by ordinary engraver's acid. The rationale of his process is this: Light is capable of hardening a bituminous surface in such a way that the usual alteration was produced, no longer acted readily upon the altered part of the surface, and therefore only the shaded portions of a partially illuminated plate would yield to such solvents as the mineral naphtith, for example, furnish. But when a metal plate had been exposed to the luminous rays, and the shadows of the shadows, nothing was easier to etch such a plate by aqua fortis, and this was what Niepce did. A plate thus made and prints from it are now in the possession of Mr. Robert Brown, of theBritish Museum. It is to be hoped that it would be placed in the Museum itself.

M. Niepce named his art *Photography.*

In 1829 M. Niepce became acquainted with a M. Daguerre, who was voted for his dioramic paintings, and who was, it is said, a neighbor of Niepce. Daguerre, who was a quack, a charlatan, and a disappointed inventor, exhibited his works to the camera. A deed of partnership was executed between the two experimentalists, and they jointly pursued their labours until the death of Niepce, in July 1833. A new arrangement was then made between his son M. Isidore Niepce, and Mr. Talbot.

At length came the memorable year 1839, when the whole scientific and artistic world was startled at the announcement that objects could be made to draw their own pictures with an accuracy and minuteness quite unattainable by hand.

In January 1839 the first specimens by Daguerre were shown, but the process was withheld until the month of July. This enabled Mr. Fox Talbot to secure to himself the merit of priority of publication of a method by which sun-drawn pictures could be successfully produced. The process of Daguerre was described to the Royal Society in January, 1839, and communicated to the Society a paper, entitled "Some Account of the Art of Photogenic Drawing, or the Process by which Natural Objects may be made to delineate themselves without the Aid of the Artist's Pencil." And on the 1st of February, in the same year, he gave another communication on the method of preparing sensitive paper and of fixing the images obtained. That the two experimentalists, Talbot and Daguerre, were independent discoverers is evident from the dissimilarity of the means by which light and camera obscura being the only means strictly in common.

Mr. Talbot's method consisted in washing letter-paper over repeatedly with alternate solutions of salt and nitrate of silver; at a certain stage a surface was obtained which gave images of objects placed in front of the eye. These images were fixed by immersion in a strong solution of salt and water, in which the unaltered parts of the chloride of silver were soluble. This process was not very sensitive, and was therefore set aside by Mr. Talbot's later discoveries of 1840.

Let us now examine the nature of Daguerre's process called the Vaporotype. A plate of silvered copper is highly polished, and then exposed to the vapour of the chemical element iodine, which imparts to the plate a series of colours, dependent on the quantity of iodine absorbed.

The exposure to the iodine vapor was carried out by placing the plate in a room which was then assumed a rosy tint, or simply a deep orange-yellow, bordering on red. The plate was then sensitive, and had only to be exposed at the focus of the camera obscura in order to obtain a picture of the objects illuminated object. Some minutes were necessary even in full sunlight. The plate was then withdrawn into the darkened room in which it had been prepared, and there it was exposed to the vapour of heated mercury, which has the wonderful property of attaching itself only to the parts of the plate which have been exposed to light; and this deposit takes place in proportion to the original intensity of light of the image. Thus a picture was produced which represented in shades of black and white the original optical image seen on the ground-glass screen of the camera.

A solution of the hypophosphite of soda was used to fix the image by removing the compound of iodine and silver which still veiled in some degree the shadows on the plate. Subsequently Mr. Fizeau improved the appearance of the vaporotypes by imparting to them a warm tinge by this hypophosphite of gold which was thrown down upon the image by a spontaneous electro-chemical action.

The vaporotype process was not sufficiently sensitive to be of any practicability. To Mr. Goddard is due the great improvement of the introduction of a second chemical agent which now enables us to make pictures in a second of time. In 1840 Mr. Goddard combined bromine with iodine and produced an improved process; he published the result in the full weather of November of the same year. Subsequently he took a few seconds; Daguerre's process requiring many minutes, even in a strong light.

One of the best modes of procedure now adopted is the following: Take a plate of silvered copper and polish it by means of tripoli powder and oil of lavender or fine flour applied by cotton velvet; finishing the polish by cloths cotton velvet alone. Then expose the silver to a mixture of iodine and bromine vapor in such a manner that the vapour of the iodine shall act equally upon the surface of the plate, to which it imparts a coating which is seen to be coloured when examined by light reflected from any white surface, a piece of paper for example. As soon as the plate has assumed an orange-yellow colour it is removed, and then exposed to the vapour issuing from a peculiar red compound of bromine with lime, called 'bromide of lime.' Over this it absorbs bromine, and assumes a rose tint, and as this shade of colour has been obtained, the plate must be removed from its exposure to the vapours. The rose colour has deepened into a plum tint. The plate is then ready for exposure in the camera obscura. No time can be spared for these various exposures as temperature influences the process. A few seconds in each case suffice. The plate must be prepared in a room kept at a constant temperature, which is the light of a candle, or that obtained through yellow glass being alone used at the last iodinating, and in some of the subsequent operations. After exposure in the camera the plate is exposed to the vapour of mercuric for a few minutes, the mercury being at a temperature of about 180° F. Here the picture is developed by the action of the mercury upon the bromo-iodised surface, the mercury being, it is believed by some, decomposed upon the plate in proportion to the amount of light which has fallen upon its surface, and which has been reflected by the camera. On its removal from the mercury box the plate is partially fixed by washing its surface with a strong solution of hypophosphite of soda. The final fixation is effected by boiling upon the plate a solution of a double salt, called hypophosphite of soda and gold. This is fixed upon the plate, and may be coloured by brushing over it colours in very fine powder. The image should be kept so as to exclude the vapours of an impure atmosphere such as is usually found in large bell-jars, as these would dissolve and once darken the light part of the image. The film of stannic acid, however, generally, may be removed by a solution of cyanide of potassium.

Having given an account of the daguerreotype, we might proceed to relate the history of Mr. Fox Talbot's researches— which led to the invention of the first successful process in photography on paper; but as these will be found detailed in Mr. Talbot's work "The Pencil of Nature," and in the Specifications of his Patents, we prefer to pass at once to con-
sider a process which has now almost superseded all others, and which certainly sprang out of Mr. Fox Talbot's discovery of the Daguerreotype. It is that of silver nitrate, when used in excess, upon paper, for the purpose of procuring an image which remained latent until developed by a solution of gallic acid. The process now used, and called the Collodion process, was that of Mr. Scott Archer, who consists in depositing a film, on glass, of collodion, containing also iodide of silver with an excess of nitrate, the development being accomplished by pyro-gallic acid in the place of gallic acid. The analogy is complete, but the latter materials improve very much the ultimate results.

Collodion is made by dissolving in ether and alcohol cotton-wool which has been altered in its properties by treatment with strong acids. The following is a good mode of proceeding, and is due mainly to the researches of Mr. Hadow: Take 15 grains of purified starch, 40 grains of gallic acid, 60 grains of tartar, 2 drachms of cochineal, and 1 drachm of oil of vitriol (specifi gravity 1·833 about) 160 drachms, of water 14 drachms; stir together, and when at a temperature of from 150 to 155° Fahr., add, bit by bit, 15 grains of cotton-wool to each ounce of the above mixture. Allow it to stand for four or five minutes, and then wash it many times in water until it is quite free from acid. Then, to make the collodion, take 9 grains of the dry cotton, and add 6 drachms of pure ether (ap. gr. 725 to 730), and 3 drachms of alcohol (sp. gr. 0·8). This mixture should be once dissolved. In another bottle prepare what is called the 'iodinating solution' by taking alcohol (ap. gr. 0·816 to 0·830) one ounce, iodide of potassium 12 grains, iodide of cadmium 4 grains; dissolve the salts in the alcohol, and keep the solution in a closed bottle. Then, while the collodion is being made, wash the glass plate with two drachms of the iodinating solution; this mixture changes by keeping, and should therefore be made only in moderate quantities. Having prepared the iodized collodion, a plate of glass is covered with it by pouring a quantity on the centre of the plate, and then allowing the liquid to flow to the corners in such a way that the glass shall be uniformly covered; the excess is thrown off at one corner into a bottle set apart for the purpose. After a few seconds, the plate is held in the cold hand, and directed firmly to the collodion bath, and left to remain in the bath, or, instead, a weak solution of cyanide of potassium may be poured upon the plate, and left there until the yellow film of iodide of silver disappears. The plate is then washed and dried, and protected by a film of varnish; amber in chloroform being usually preferred for this purpose.

The picture thus obtained is, as in the calotype or Talbotype process of Mr. Fox Talbot, a negative one, that is to say, a picture having its light and shade reversed; though by modifying the collodion process direct positives may be at once obtained; a good negative, however, is a more valuable acquisition. In order to obtain copies correct in light and shade and position, a positive has to be made. There are many processes by which this may be performed; but we will here give only one, which answers perfectly. Take the white of an egg and beat it up, with every fluid ounce of it 15 grains of common salt: remove the froth thus obtained, and continue beating until all has become froth. Leave this froth to itself, and the greater part of the white of egg will become albumin. Pour the liquid into a flat shallow dish, and upon it place carefully, so as to exclude bubbles of air, a sheet of thin paper, French paper is usually chosen; leave the paper for two or three minutes, then dip it carefully in the coated plate, and coat only one side with the 'salted albumen,' as the white of egg is called. Then carefully remove the sheet, and pin it up by a corner to dry. This operation can be carried on in daylight. To make this paper sensitive, it is steeped upon a solution of nitrate of silver, or, if one wishes to work in excess, of starch. Here it is left for two or three minutes, and then renewed and suspended to dry. This last operation must be per-

formed in a room dimly lighted, as in the case of the daguerreotype and collodion final preparation. Upon the dry sheet, the collodion is spread with a watch glass, or any other vessel, so as to cover the whole exposed in a proper 'pressure-frame' to the sun or to daylight. After a few minutes the picture is found printed, and must next be fixed by immersion in a solution of hypo-sulphite of soda, one part of the latter in from 6 to 10 parts of water. Ten or fifteen minutes' immersion would suffice to fix the picture; but in order to produce an agreeable tint of colour, a longer immersion is had recourse to, with the addition to the 'fixing bath' of a few grains of a neutral alkali, such as ammonia. After fixing, excess of silver is removed. After this bath, the picture is removed, and washed repeatedly with plenty of water; hot distilled water being used at last. This fixing bath is made fresh for each day's work. The pictures, when washed and dried, may be mounted on cardboards or protected in glass cases, to injure the picture under some circumstances. Exposure of the finished picture to impure atmospheric vapours, and to damp, is to be avoided. Mr. Maloney has advised that the fixing solution should be heated in solution of caustic potash in order to secure its greater permanency. He also insists on the injurious action of sulphur in certain forms upon the print.

There is another branch of photography which is worthy of the attention of the student, but which has not yet come into practical operation in a perfectly satisfactory manner. It is that of photographic engraving. The labours of Niépce, Grove, Fizeau, Talbot, Pretsch of Polteivin, and others have done much to forward this art, but at present all is too uncertain and too slow to encourage extending this article by a description of the processes.

Stimulated by the experiments of Sir John Herschel, M. Ed. Becqueval and others, M. Niépce de St. Victor commenced a series of beautiful experiments upon coloured flames and the production of photographic images. He laid before the Academy of Sciences, Paris, a detailed memoir upon the subject on the 4th of March, 1861. This was followed by others on June 2, 1861; Feb. 9, 1862; and November 6, 1863. By the method described in these Labours a series of photographs may be obtained on the glass plates which had been rendered sensitive by a chloride of copper, images which faithfully reproduced the colours in coloured engravings, flowers both artificial and natural, lay-figures dressed in stuffs and gold and silver lace, precious stones, etc. These were obtained by, the process of photographic printing in and the camera; the light and brilliant colours being obtained with comparative ease, but the darker and more sombre colours more slowly. The colours he rendered more intense and may be sensitized by the action of ammonium. But beautiful as were the results, and much more nearly as they seemed to approach the solution of the problem of photographing the colours of nature, they proved to be only comparatively permanent. The colours obtained by this method rapidly fade, and the effect is not very durable. This method (mainly due to M. Ed. Becquerel) M. Niépce named Heliochrome. M. Ed. Becqueval, by the use of silver plates, coated with a dark compound of chloride and silver, obtained the decompositions of hydrate of silver, and has succeeded in obtaining coloured images of the solar spectrumbut no method of fixing them permanently has been discovered.

In scientific photography much remains to be done. We know not but the properties of light in its influence on vegetation and animal life. Mr. Robert Hunt and others have, however, established some interesting facts in the former direction, and lately some experiments made upon the eggs of insects seem to show that light of various colours and intensities acts differently according to its colour and other peculiar qualities. There is no branch of science which will better repay the philosophical experimentalist for his investigations than that of photography. The most marvellous and marvellously results have been constantly ob-

tained. As an instance let us take the recent discovery of M. Niépce de St. Victor, which seems to prove that bodies acted upon by the sun absorb its powers in such a manner that they can emit photographically the same kind of influence which they absorb: thus proving that by setting up of light—to speak thus has been arrived at.

Those who would pursue photography further should consult Hunt's 'Researches on Light,' the Abbé Moigno's 'Photographic Alphabet," Ed. Becquerel's 'Travais on Photographic Chemistry,' Thebes! paper also of interest to be found in the 'Comptes Rendus'
of the Paris Academy of Sciences, in our own Royal Society's 'Transactions,' and above all in the journals of the various Provincial Societies. 

PHYGIS, a genus of fishes belonging to the family Gadidae. It has an elongated body; two dorsal fins, the first short, the second long; ventral fins with a single ray only at the base, afterwards divided; chin with one barbule. 

Fishes belonging to this genus are found in the British coasts. It has been taken most frequently in Cornwall. It is about two feet in length, but not very good eating.

PHYLOSTOMA. [CRITZETID.] 

The two commonest diseases of the human system are treated of in the 'Penny Cyclopædia,' either under the head of the particular disease, or the organs or system of organs disordered. In the First Supplement, under the article Disease, a classification of diseases will be found. In the present article, some forms of disease are noticed which have either been recently described or on which new light has been thrown by recent research. The subjects have been arranged for the convenience of reference in the alphabetical form. 

Acclimation is a term applied to that change in the human system produced by residence in a place whose climate is different from that to which it has been accustomed, and which enables it to resist those causes of disease which render such residence injurious to the health of the individual. 

A person is thus rendered similar in constitution to the natives of the country which he has adopted. This subject is one of great importance, and has not yet received the attention it demands. As far as present evidence goes, it appears that in such cases as have been brought under observation, the physical and intellectual development, the greatest amount of health, and reach the greatest age, above 40° in the western and 45° in the eastern hemispheres. Whenever they pass below these latitudes, their health deteriorates, and becomes extinguished. In the northern states of America the mortality of the black population is double that of the white.

The laws of climate show that each race of mankind has its own peculiar and unchangeable limits. All of them seem to possess a certain degree of constitutional pliability by which they are able to bear, to a certain extent, great changes of temperature and latitude; and those races that are indigenous to any country, are better accustomed to shifting sun and colder climates than to the opposite latitudes. The inhabitants of the Arctic regions, as also of the tropics, have a certain pliancy of constitution; and while the inhabitants of the middle latitudes may endanger 30° south or 30° north with comparative impunity, the Eskimians in these latitudes would be regarded as incurably diseased; and on the other hand, do not have to withstand the vicissitudes of climate encountered in traversing the 70° of latitude between Greenland and the equator. The fair races of northern Europe below the arctic zone find Jamaica, Louisiana, and India, to be extreme climates; and they and their descendants are no longer to be recognised after a prolonged residence there. When an Englishman is placed in the most beautiful part of Bengal or Jamaica, where malaria does not exist, and although he may be subjected to no attack of acute diseases, but may live with a tolerable degree of health his threescore years and ten, he nevertheless ceases to be the same healthy individual he once was; and, moreover, his descendants degenerate. He complains bitterly of the heat, and becomes tainted; his plumy plerotic frame becomes attenuated; his blood loses luster and red globules; both mind and body become sluggish; gray hairs and other marks show that age has come on prematurely—the man of forty looks fifty years old; the average duration of life in England is less than in the United States (with insurance tables); and the race in time would be exterminated if cut off from fresh supplies of emigrants from the home country.

Our army medical historians tell us that our troops do not show the same degree of influence and resistance in the distant land affords no immunity from the diseases of its climate, which act with redblooded energy on the stranger from the temperate zones. On the contrary, the mortality among officers and troops is greatest among those who remain longest in those climates.' (Johnson, Martin, Tulloch, Macpherson, Boudin.) Dr. Macpherson also makes the significant remark, that the small mortality among officers compared with soldiers, in India, is due to the greater facilities officers enjoy of retaining their health when they fall sick. Although the constitution of the man may be so modified that comparative health may be retained, yet there is a morbid degradation of the physical and intellectual faculties which eventually takes them back to their native climate, they may yet revert to the healthful standard of their original types. The good effects of limiting the period of service of our troops abroad to three years, has shown this in sustaining for a greater period the strength of the regiments in the more exposed regions of the European regiments in India having been followed by the most disastrous results. "European regiments in India have melted away like the spectres of a dream. A thousand strong man form this year a regiment: a year passes, and one hundred and twenty-five new recruits are required to fill up the broken column; and eight years having come and gone, not a man of the original thousand remains in the dissolving corps."

With regard to the British Fusilier European regiment, for instance, Dr. Arnot has shown that its losses average 104 per 1000 per annum; a loss equivalent to the entire absorption of the regiment in nine years and seven months.

In Bengal also it is an ascertained fact, that a British regiment may be entirely changed by men who have not been in the country for a year, in favourable times, and with all the improved conditions of the service. Dr. Arnot's statistics show that the Bengal army loses annually 9 per cent. of its numbers, giving a total loss in eight years of upwards of 14,000 men out of an army of 165,180 men. (Atikin's 'Handbook of Medicine.')

In the island of Ceylon the rate of mortality has been recorded amongst five different races of which the British troops are composed. The following table gives the result:

<table>
<thead>
<tr>
<th>Race</th>
<th>Annual death in 1000 men</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native troops of Bengal and Madras</td>
<td>12</td>
</tr>
<tr>
<td>Troops recruited on the coast of Ceylon</td>
<td>23</td>
</tr>
<tr>
<td>Malays</td>
<td>24</td>
</tr>
<tr>
<td>Negro troops</td>
<td>69</td>
</tr>
<tr>
<td>English troops</td>
<td></td>
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</tbody>
</table>

Although from these facts it would appear there is an insuperable barrier to the prolonged occupation of tropical countries by white races, yet much may be done by attention to the laws of health and disease. One cause of the great amount of mortality amongst Europeans in the tropics is that they are peculiarly inclined to succumb to the effects of hot and humid weather when they arrive in the hotter parts of the world. An attention to diet, clothing, and residence, would do much to remove many of the causes of disease. It would appear also that many of the races that now inhabit cold climates have never been exposed to the climatic conditions that have gradually produced in the constitution, as by the slow advance of peoples north or south, may overcome that tendency to succumb which is so evident in the rapid removals to which the above data refer. The question of the permanent occupation of tropical countries has become one of vital importance to the two great European governments of England and France. How this can be done at the least expense of human life can only be ascertained by the study of the laws which regulate acclimation.

Addison's Disease. The name of Dr. Addison, physician to Guy's Hospital, has been connected with a diseased condition of the system, which is made apparent by a discolouration of the skin. Hence this disease is also called 'Brown Skin.' The existence of this discoloured skin has long been known as a symptom of certain cachectic states of the system; but Dr. Addison was the first to point out that this state of the skin always existed in connection with such a state of the body, as now to be called Addison's disease. These bodies belong to the class of ductless glands, and till the time of Dr. Addison's researches upon brown skin appeared, little was known of their uses and functions in the human body. The following conclusions with regard to these bodies have been arrived at by Dr. Harley as the result of his experiments—

1. The supra-renal capsules are not solely vital organs.
2. They are not absolutely essential to life.
3. The removal of the right is generally more fatal than the left.
4. That convulsions do not necessarily follow their removal.

5. The absence of their function is attended neither by great anaemia nor debility.

6. If death follows an experiment, it occurs as the result of injuring neighbouring parts.

7. Absence of the supra-renal bodies is not proved to have any specific effect on arteriosclerosis of the heart, or in increasing the formation of blood-crystals.

8. The suppression of the supra-renal capular function is not attended by an increased deposit of pigment in the skin or its appendages.

9. The examination of the connection of the bronzed skin and supra-renal capular disease is more likely to be solved in the dead-house than in the physiological laboratory.

These conclusions were chiefly arrived at by experiments on rats, but they would seem to indicate that the connection between the bronzed skin and supra-renal capular is not clearly made out.

The distinguishing features of the disease to which the same bronzed skin has been given, are general languor and debility, great feebleness of the heart's action, irritability of the stomach, a peculiar change of colour of the skin, and these symptoms usually occurring in connection with a diseased condition of the supra-renal capular. The general symptoms are in fact those of anaemia, or cases in which the visibility of the capular function is generally speaking a conduct of the skin, that it usually increases with the advance of the disease. The anaemia, languor, failure of appetite, and feebleness of the heart become aggravated; a darkish streak usually appears upon the commissures of the lips, or the commissures and the under part of the chin may be sunken, and dry harsh condition of the surface so commonly observed in ordinary malignant diseases; the pulse becomes smaller and weaker, and without any special complaint of pain or uneasiness, the patient at length gradually sinks and expires. In one case, which may be said to have been acute in its development as well as rapid in its course, and in which both capsular were found universally diseased after death, the mottled or checked discoloration was very manifest, the patient was restless, morose, marked, and the sickness was great, and vomiting urgent; but the pulse, instead of being small and feeble as usual, was large, soft, extremely compressible, and jerking on the slightest emotion or excitement, and the patient speedily died. (Addison.)

Although the connection between the state of the skin and the disease of the capular was exhibited in all Dr. Addison's original cases, many exceptions have been recorded. Cases have occurred in which extensive disease of the capular has occurred without the sickness of the skin, and cases of bronzed skin have been seen where no disease of the supra-renal capular could be detected after death.

1. Harley, in the paper before referred to, concludes:—

1. That bronzed skin may exist without the supra-renal capular being diseased.

2. That complete degeneration or total absence of the supra-renal capular may occur without any bronzing of the skin.

3. That bronzed skin may be associated with a variety of differently-marked conditions of the system, among which a prominent one is disease of the supra-renal capular.

4. That bronzed skin may be present without any disarrangement of the capular, or characters of the disease occurring without the sickness of the skin, and cases of bronzed skin have been seen when no disease of the supra-renal capular could be detected after death.

5. The blood has been examined by the microscope in some of these cases, and found to present an increased quantity of red corpuscles, and a diminution of the white corpuscles in the disease known as Leucocythemia. (Bloom, Duglass, &c.)

6. The microscopic character of the skin has been carefully examined in this disease, and it has been found to present the same appearance as observed in the skin of the black man of America. (Bloom, supra-renal capular was found to be increased, and existed in larger quantities in the under than in the upper layers of the epidermis.

The treatment of this disease is not affected by our knowledge of its supposed causes. The remedies which would be applicable to bloodless and diseased conditions of the system should be used here. Tonics, nutritious diet, fresh air, and the means resorted to for restoring health in anaemia and leucocythemia may be had recourse to here.

The prognosis in this disease is unfavourable, although cases are reported in which recovery has taken place.

Anaemia, a diseased condition of the human body, in which is implied either a morbid condition of the blood, or a relative diminution of some of its most important constituents. This disease is also called oligonemia and anamonies, terms which, like anaemia, express a deficiency or paucity of the constituents of the blood. This state of the system is generally indicated by the excessive paleness of the face as well as by the weakness of the body. The lips are pale. The conjunctiva is of an unnatural white, having a pearly lustre. The veins on the surface are small, blue, and collapsed. These general symptoms are frequently attended with derangements of the nervous system. There is frequently violent pain in the head, and not uncommonly, ordered sensations, as singing in the ears and flashings before the eyes. The whole surface of the body is frequently naturally tender, the slightest touch causing the patient to start. The course of the spine is frequently excoriated, leading to the supposition that there is spinal irritation.

The circulatory system is deranged; palpitations of the heart on after slight exertION. The pulse is mostly small, feeble, and quick, excited to rapid action on slight exertion. The disease is marked by diminution of the blood-corpuscles, which is generally laxitude and inability to take much exercise. This disease is accompanied with disturbances of the circulatory system, which may be detected by means of the stethoscope. These are heard in the heart, arteries, and veins. The true pulse, the pulse of the capular, and the arterial murmur are heard distinctly. The arterial murmurs are not frequently heard; they are synchronous with the beat of the pulse, and when present may be recognised by the character of the pulse. The venous murmurs are heard more frequently, and may occur; these are various buzzing, humming, musical, and singing murmurs. "They are most frequently heard on the right side of the neck, at the junction of the external and internal jingular vein." (Aitken.)

The venous murmurs are seldom absent to a greater or less extent in anaemia.

When the blood of anaemic persons is examined under the microscope a deficiency of blood globulins is observed. Andral records a case where he observed that blood globulins were 30 parts of blood, and 70 parts of blood corpuscles. In 1000 of blood. The true or normal proportion of the blood, as far as observations at present go, seem to suffer little alteration.

The causes of anaemia are being acting on the system by which the thoroughness of blood is disturbed. They are the development of the blood cells prevented. Thus, amongst the causes of this disease we may reckon: 1. Want of food. 2. Want of proper food. 3. Indigestion or imperfect nutrition, from whatever cause. 4. Derangement of the liver, spleen, &c. 5. Haemorrhages, &c. from hemorhoids, the stomach, lungs, wounds, &c. 6. All extensive discharges from wounds, ulcers, or mucous surfaces.

A knowledge of the causes of anaemia at once suggests its treatment. Where it depends on a want of food altogether, or of improper food, then food of a proper kind should be supplied. Where improper food, as alcohol, produces imperfect assimilation, it must be withdrawn. Deficient nutritive changes often come on as the result of insipid air, and change from an impure to a pure air often acts most beneficially. In certain cases dependent on imperfect blood-cell formation great benefit results from the administration of iron. Cases are recorded in which, under an iron treatment, the blood-cells have increased from 25 to 85 in a 1000. Other remedies which greatly stimulate the blood-forming organs of anaemia in marjor districts quinine is of great service.

Bright's Disease. An affection of the kidneys, having very definite symptoms, and exhibiting uniformity of structure. The disease was found at Guy's Hospital, and is generally called after him. This disease is also called Albuminuria and granual disease of the kidney; the first on account of its diagnostic symptom, albumen in the urine, the second on account of the morbid conditions presented by the kidney. This formidable disease presents
The treatment must be active in the early stages. Purges may be given and blood abstracted locally, and the urine should be perpetually kept clear. For the patient's benefit. When chronic, diaphoresis and diuretics are both admissible. Amongst the former, Dover's powder and warm baths, and the latter, bitartrate of potash and digitalis. The patient should be protected from cold; a warm climate is a serviceable means of keeping the circulation in good working; fresh air and exercise, are desirable.

Blood: Diseases of A large number of diseases are now referred to disordered conditions of the blood. Amongst these are many which are not distinguished by the name of blood. Continued Fevers, Eruptive Fevers, Syphilis, Mercurial Poisoning, Rheumatism, Gout, Scrofulosis, Obesity, Leucocytosis, and Pyæmia. With the exception of the two last, these diseases have been treated of in the "Penny Cyclopaedia." Leucocytosis and Eosinuria is the disease to which reference is made by Dr. Bennett, of Edinburgh, in 1845. The name is derived from the fact, that in these cases the white or colourless corpuscles of the blood are increased in number. This state appears to be brought about by loss of blood, chronic disease, more or less separations of the lymphatic glands and spleen. It is accompanied by debility, wasting, cough or diarrhoea, and a generally unhealthy condition of the system. The increase of the white corpuscles of the blood is not supposed to occur of itself, but is generally dependent on some merited condition which has preceded. The most frequent complication is enlargement of the spleen. Vogel states that in nineteen cases this complication existed in sixteen. Occasionally the spleen shrinks, in which case the increase is found in the lymphatic glands. The lymphatic glands are the organs most extensively affected. The occurrence of this disease has led to highly interesting inquiries as to the origin and nature of the white cells of the blood, which are increased in such of these cases. Dr. Bennett, in his work on the "Penny Cyclopaedia," (1868), gives the following conclusions as to the result of his own elaborate and carefully conducted inquiries:

1. That the blood-corpuscles of vertebrate animals are originally formed of lymph-corpuscles, which are separated from the lymphatic blood, whilst healthy urine has a specific gravity of 1.080. It contains less urea than healthy urine. Under the microscope it also presents appearances indicative of the nature of the disease. These appearances are more marked in the tubules of the kidneys, formed by substances produced in various stages of the disease. They are thus classified by Dr. Bennett:

2. Exudative casts, consisting of the coagulated exudation or fibrine which is poured into the tube during the inflammatory stage.

3. Desquamative casts, consisting of masses of the epithelium lining the tubes, and occurring in all stages of the disease.

4. Fatty casts, consisting of patches of epithelium as in the last, but which have undergone a fatty transformation by the accumulation of a greater or less number of fatty granules in its cells.

5. Waxy casts, presenting an exceedingly diaphanous and structureless substance. They are frequently associated with the two last.

Dr. Bright originally described three stages of this disease, but later observers have recognised six.

1. The papillary form, in which the kidneys are enlarged, and show an increase of blood in the tissues. In this stage only a small quantity of urine is passed containing the exudative and desquamative casts.

2. In this stage the kidney is enlarged to nearly double its normal size. The tubes of the kidney are obliterated by the inflammatory deposit.

3. The kidney presents a mottled appearance. It is probably a transition from the first to the second stage.

4. In this stage the kidney is large, dense, and white. The tissues of the kidney have become changed. The urine is scanty, of low specific gravity, and defective in urea and other excretory matters.

5. In this stage the kidney is hard, granular, and contracted. The kidney is smaller than in health, the surface is uneven and puckered, the tunica adherent. There is no deposit in the tubes, but fibrous matter has been deposited in the substance of the kidney, and the tubes are strangulated. The urine may not contain albumen. Its specific gravity is sometimes as low as 1.005.

6. This stage has been called the "coarse kidney." The organ is large and dark. The specific gravity of the urine is high, and is loaded with albumen. The presence of fatty matter in the casts of the kidneys may occur in any of these stages, and does not appear to exist as a separate form of the disease.

The cause of this disease is a thing which will undiscoverably elude the efforts of the medical art. Thus it comes on as the result of spirit drinking, which powerfully excites the action of the kidneys. Exposure to cold and diminution of the action of the skin will also produce it. It comes on frequently after scariasis, when the skin is highly susceptible of any diminution of temperature.
odour, the lungs are congested, the skin becomes daily more yellowish, articulate swellings with swellings in the intra-synovial cavity occur successively in several of the joints. The tongue is dry, and coated with a brown fur; the teeth and lips are covered with sores, the abdomen is tender and frequently tympanitic, the pulse is quick and becomes tremulous and rapid, the eyes become dull, and yellow, and yellowish yellow in self, the voice is lost, and the patient sinks from the fourth to the tenth day.

After death abscesses are found in the lungs, liver, spleen, brain, kidneys, heart, pleura, joints, muscles, and the subcutaneous parts. 

In many cases pus-cells, or an increase of the white corpuscles, have been found in the blood. This increase is not, however, a diagnostic symptom, as many cases have occurred in which pus-cells have been observed in the blood (which are not easily distinguished in the blood from pus-cells, and have been supposed to be identical) has been observed.

The pathology of this disease has excited much discussion. While some have regarded it as entirely dependent on the introduction of gas into the blood, others maintain that it depends on the introduction of a peculiar poison into the blood. Dr. Bennett injected pus into the blood of an ass without producing ill effects, and the above symptoms come on without any introduction of pus from without. It is more probable that the disease is a peculiar state of the blood, either arising from vital changes in itself, or produced by the introduction of an external poison.

The disease is most frequently fatal, and no one plan of treatment can be laid down. Where suppurating surfaces are present these must be attended to, and accumulations of pus in abscesses should be removed by free incisions. The system must be supported by stimulants. Large doses of quinine have been recommended, and the patient is very frequently left to the integrity of the pulse, and frequent pulse, terminating in from two to seven days, and having for its cause excess, exposure, over-fatigue, &c. (c. e.) the cause of febricula is not specific.

"Fibrilicula.—A disease arising from a specific cause, attended by rigors and chilliness, headache, vomiting, white tongue, epigastric tenderness, confined bowels, enlarged liver and spleen, high-coloured urine, hot and dry skin, and frequent pulse, terminating in from two to seven days, and having for its cause excess, exposure, over-fatigue, &c. (c. e.) the cause of fibrilicula is not specific."

"TYPHOID FEVER.—A disease arising from a specific cause, attended by rigors, chilliness, headache, successive crops of rose spots, frequent pulse, sonorous rcle, diarrhoea, fulness, renaissance, and tenderness of the abdomen, gurgling in the right iliac fossa, increased splenic dulness, delirium, dry and brown tongue, and prostration, and terminating by the 30th day. After death enlargement of the mesenteric glands, disease of Peyer's patches, enlargement of the spleen, disseminated abscesses of the lungs, &c."

"Tuipaus FEVER.—A disease arising from a specific cause, attended by rigors, chilliness, headache, bulimy rash, frequent pulse, delirium, dry brown tongue, and prostration, and terminating by the twenty-first day. After death, disseminated abscesses of the lungs, &c."

"(Medical Times, 20th Paper.)"

On the other hand, Dr. Duncan of Liverpool maintains, that there is no specific difference between the various kinds of contagious diseases, and that there is no distinction between this and intermittent or remittent fevers. All these, he maintains, belong to one form of disease, and are curable by one remedy, and that is quinine. He prescribes ten grains of the sulphate of quinine every two hours until five or six doses are taken, and states that it cuts short all forms of fever in the same way as it does intermittent fever or any other disease.

This practice has been followed by many medical writers with favourable results, but with others it has entirely failed. Dr. Bennett of Edinburgh tried this remedy in nineteen cases, which he has related in his "Chemical Lectures," but the result of these cases was not favourable to the use of this remedy.

Daresia (Scarlina febris) is a peculiar fibriluse disease, conjoined with sudden severe pains in the small joints, which are usually swollen. It is accompanied by heat of skin, intense pain of the head and eyeballs, and the appearance of a cutaneous eruption on the third or fourth day. It is attended by paralytic symptoms on the part of the nerves into which the disease develops itself epidemically. The chief peculiarity of this disease is the combination of the symptoms of an exanthematic fever with rheumatic or neuralgic affections of the joints.

This disease was introduced into this country by an emigrant from France. "It has been chiefly prevalent in Rangoon, Calcutta, Berberapmore, Benares, Chunchighur, in the East Indies; the island of St. Thomas in the West Indies; the Southern States of America; the ports on the Gulf of Mexico; the towns of New Orleans, Savannah, Charleston, Philadelphia, and New York. It was epidemic in 1824-28, and nothing appears to have been heard of it again till 1849 and 1850, when it again visited the Southern States of America."

The general course of this disease is that the patient is attacked by pricking pains of light, chilliness, and pains in the back and joints. The small joints swell, the skin becomes hot, the pulse frequent, and the face flushed. The tongue is red. Sometimes an eruption appears at this stage, which, however, is of short duration. After two or three days, after which it subsides, leaving the patient very feeble. This remission is, however, only temporary. In the course of two or three days there is a return of the fever and pains, with a thickly coated tongue, nausea, and tenderness of the epigastrium. On the sixth or seventh day a scarlet rash appears on the hands, which rapidly spreads over the whole of the body, and gives relief to the febrile irritation. The eruption is very irregular, sometimes being smooth, but at others being papular, vesicular, purpuric, or even furunculous. The symptoms of the disease do not diminish, but assume some rheumatic stiffness, and feelings of weakness and mental depression. During the last epidemic at Calcutta the throat was sore, and the articular symptoms were less obvious.

The treatment of this disease consists simply in the palliation of the symptoms. When the nervous irritability and pain are considerable, then opium has been found of essential service. The disease might at first sight be regarded as a mild form of typhus. Some of the symptoms, however, are sufficiently characteristic.
membrane is found in the larynx or trachea, it is always subsequent to its appearance in the fauces. At the commencement of the disease, the membrane is seen in the form of a white spot on the pharynx or tonsils, from which it gradually extends all around. As it goes on, the membrane comes away in spots or patches, which, when a large membrane may be seen of a deep red or even of a purplish and olaire colour. During the progress of the disease the cervical and submaxillary glands become swollen, and there is a fetid discharge from the nose and mouth. As the slough succeeds the discharge, it is mixed with pus, and looks as if a hearth were gradually occuring.

The general symptoms are those of low fever. The disease sets in with shivering and intense depression, there is dryness and tingling of the throat and ears, difficulty of swallowing, and tendency to vomit. It is necessary to load the tongue is loaded, the pulse is frequent and feeble. In the early stages it might be taken for scarlet fever. But there is no active fever, no eruption of the skin, no redness of the papilla of the tongue, and when the patient recovers, no desquamation of the cuticle as is constantly the case in this disease.

The prognosis in these cases is unfavourable. This disease generally terminates life by extending to the air passages and producing effusion in the glottis, which speedily terminates life.

This disease is from the beginning attended with a great depression of the vital powers, and its treatment demands that the vital processes should be sustained. A purgative may be given at the onset, but in most cases wine may be administered. The writers also give a mixture of the chlorate of potash administered in the same way as in scarlet fever. To this may be added the preparations of ammonia. Quinine has also been highly commended, with the mineral acids. The throat also requires treatment, and the tonsils when large should be employed, nitrate of silver and chloroform. The nitrate of silver is applied in the proportion of one dram to an ounce of water on a sponge several times in the course of the day. Dr. Watson recommends chloroform in the case of children. This relieves the febrile smell which is very disagreeable to the patient and those around.

This disease occurring in districts, and attacking in succession the members of a family, has led to the conviction that it is contagious. As it is so dangerous a disease, it would be well to act on the doubt, and to take those measures which would be adopted in the case of contagious diseases, as small-pox and scarlet fever.

Glanders or Farcy is a name given by veterinary oppo to the disease of horses, and other cattle. It appears in the form of a suppurative disease of the mucous membrane of the nose and of a pustular eruption. The former is sometimes called glands and the latter farcy, but the two often occur together, in the same individual or in the same animal.

In 1821, Mr. Muscroft drew attention to the fact that this disease could be communicated from the horse to the human system. In the same year cases occurred in Germany, and since then it has been demonstrated by a large number of cases that this disease often spreads from the horse to man. When it attacks man it is characterised by vascular injection of the nasal mucous membrane, on which cherry-like sores are formed, extending to the frontal sinuses and neighbouring mucous surfaces, from which a profuse and offensive discharge flows. At the same time a tubercular or pustular eruption appears upon the skin, followed by purpurating bloody or gangrenous ulceration in various parts. These symptoms may be either acute or chronic. In the acute case a blood filled vesicle appears, which being covering, in chronic cases the local affection alone presents itself. The acute disease is ushered in by rigors, pains in the back and limbs. These symptoms are followed by phlegmonous tumours in various parts of the body, which are accompanied with pain and tenderness, and in abscesses or buboes a purulent pustular eruption appears upon the skin, followed by purpurating bloody or gangrenous ulceration in various parts. The disease is ushered in by rigors, pains in the back and limbs.

At the same time a discharge takes place from the nostrils of a matter more or less purulent, viscid, and mixed with blood. The eyeballs frequently become tumefied, and discharge a thick viscid matter like that from the nose. In two or three days the membranes on the face, trunk, and limbs are preceded and accompanied by profuse and fetid sweats. The eruption is scattered, and resembles, according to circumstances, the vesicles of cow-pox or the pustules of the plague. It is sometimes accompanied with large vesicles (bullae), which become black and discharging gangrenous sores. At first the pulse is full and quick; but it becomes rapid, small, irregular, and intermittent. The tongue is at first loaded with white fur, which afterwards becomes brown or black. Diarrhoea and dysentery often occur in the course of the disease. This disease is generally fatal from the seventeenth to the twenty-first day. In the chronic cases the febrile symptoms are not so acute as in the former, but the local symptoms are the same, but they progress more slowly. The abscesses are attended with a large amount of subcutaneous inflammation. In this state patients may recover, but they die from a fortnight to a month. A twelvemonth has been known to elapse before a person has been cured.

There is no doubt that these symptoms are the result of a poison introduced into the system by the horse. In all cases contact with glandered horses has been ascer-

The disease is very malignant, and the glands have been removed, but the disease has been produced. The disease has also been produced by compelling animals to swallow the poisoned matter in their food. There can, therefore, be no doubt that the poison can be absorbed both from mucous and cutaneous surfaces. This being ascertained, it becomes more than ever necessary to prevent contact with glandered horses. Such horses have been known to give disease to persons riding behind them or swimming near them by the water from the nostrils into the air. All glandered horses ought to be destroyed. In Germany the conviction of the danger of this disease is so strong, that all horses proved to have come in contact with glandered horses are destroyed. Not only can this disease be communicated from horse to horse, and from the horse to man, but cases have occurred in which those attending glandered individuals have become affected. The poison of glanders soon manifests itself. Turner inoculated two young donkeys, and in one the maxillary glands became tender on the second day, and the discharge took place from the nose on the third day, whilst in the second the glands became swollen on the third day, and the disease terminated in suppuration. A case has been recorded in which the incubation of the poison must have taken at least three months. In the human being the poison has remained latent from two to eight days after exposure.

This disease in its acute form is very fatal. Of fifteen cases recorded by Rayer only one recovered. Of the treatment, therefore, little can be said as a matter of experience. The general symptoms in the latter stages are those of low malignan fever, and a stimulant plan of treatment is indicated. Observations are wanting, and the swelling may be cupped, but there is no reason to believe that the bleeding did any good. In the chronic forms of the disease recovery is more frequent. The symptoms indicate the necessity of a cautious and prolonged course.

Micrococcus Disease. The recent improvements in the construction of the microscope have not only rendered this instrument necessary in physiological and pathological investigations, but essential as a means of diagnosis in many discussed conditions of the human system. The very general demand for this instrument as an important aid to the eye in examining minute structures and objects, has led to the construction of various forms adapted for the use of the medical man. The description of this instrument will be found in the article Microscope, and an account of the methods of using it under Microscopes, Ums or, in the second supplement of the 'Penny Cyclopaedia.' In the present article the application of this instrument to the diagnosis of micrococcus disease will be referred to, and the subject may be divided under the two heads of Diseased Structures and Diseased Secretions.

Diseased Structures.—1. Cancer. The distinction between cancer and other forms of diseased structure in the human body is one of the most important departments of diagnosis, as upon this depends a just estimate of the action of any particular system of treatment, and the solution of the question of the curability of cancer. There can be no doubt that cancer is the most important of these forms, and we have no claim to be regarded as such; whilst others, with a true cancerous character, have been overlooked. Although the microscope cannot in all cases decide the character of a questionable ulceration, it has nevertheless thrown great light on the subject, and we think that it is an instrument of great importance in their determination. Cancerous exudation generally presents three forms, which, however, are constantly found running one into the other. These have been
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named *schirrhous*, *emphaloma*, and *colloid cancer*. In all these forms certain cells are discovered by the aid of the microscope, which have been called cancer-cells. These cells may be spherical, ovoid, cubical, oblong, square, heart-shaped, or of other indescribable forms. In size they vary from the 1/30th to the 1/20th of an inch in diameter. The wall of these cells, when young and smooth is indistinct, but when old it becomes thickened and more or less corrugated. These cells contain in their interior always one nucleus, often two, and sometimes a larger number. These nuclei vary in size. Besides the nuclei the cells contain a colourless fluid, which is at first clear, but afterwards becomes opalescent from the presence of a great number of granules. If water be added to the water the cells become enlarged by its absorption into their interior. On adding to these acetic acid the young cells become absorbed, whilst the older cells are rendered more transparent, and the nuclei remain unaffected, or become thinner fibrous. In *schirrhous* these cells are found either in distinct cysts or amongst a mass of filaments which vary in size, and run in different directions, sometimes forming waved bands, and at others an inextricable pleasia. In emaphalomas the same fibrous structure is observed, but it is looser. In the softer parts no traces of fibres are observed, and the cancer-cells abound. When blood is extravasated in this structure, it constitutes the form of cancer known by the name of thrombomatous cancer. The cancer-cells, however, also to consist of a fibrous structure, but which is so arranged as to form argilae or loculi, which are filled with a grey or amber-coloured glutinous matter. This matter is sometimes quite unchangeable, at other times it presents the necrosed cells characteristic of cancer.

Sometimes the cancerous matter is found mixed with oil globules, and crystals of cholesterol and margaré. At other times it becomes hardened by the deposit of calcareous substances. This indicates the tendency in the production of cancer to assume the forms of fatty and mineral degeneration. (Bennett, Principles and Practice of Medicine.)

2. Tubercle. This form of disseased structure is found in the image of persons laboring under phthisis. It generally presents itself to the naked eye by white patches, a semi-transparence varying from that of cream to a substance resembling tough bose. "A small portion, sponged between glasses and examined under the microscope presents a number of irregular shaped bodies approaching a round, oval, or triangular form, varying in their elongated diameters from the 1/20th to the 1/10th of an inch. These bodies contain from one to seven granules, are unaffected by water, but rendered very transparent by acetic acid." (Bennett.) These bodies are generally spheroidal, oval, or oblong. They are composed of molecules and granules, in a greater or less number, according to the consistence of the tubercle. When the tubercle becomes hardened by calcareous deposits, few of these minute corpuscles surround the mass of irregular particles of phosphate of lime, and crystals of cholesterol.

In the earlier stages of tuberculous deposit of the lungs, the system is found to contain small portions of the disintegrated tissue of the lungs, and in some cases this appearance has been observed when no physical or other decided indications of tubercle existed.

3. Blood. In some forms of the disease the blood-cells exhibit a changed character, which can alone be detected by the microscope. This is seen most remarkably in a disease recently discovered by Dr. Bennett, of Edinburgh, called "Leucocytosis," in which the white corpuscles of the blood, which are much fewer than the red in healthy blood are found to be greatly increased in number. [Bloor, Dundas Cl.]

In many diseases the blood presents an unusual degree of thickness. In this condition the red corpuscles easily lose under pressure their rounded margin, and assume a candate or flask form. They do not aggregate together in the same form of rolls, but present masses of an irregular shape.

In blood produced by internal hemorrhage the red cells readily break down and are partly dissolved. The liquor sanious is also milky, and it is also to contain a large number of granules. In these conditions also the blood-cells frequently present nuclei in their interior.

In cholera the blood has been observed to undergo a remarkable change. Dr. Bennett states, that in blood he examined the red corpuscles were paler than usual, the colourless ones were normal, and mingled with these were others which varied both in shape and size. The latter were generally circular, but some were oval and a few circular. Their long diameter varied from the 1/20th to the 1/40th of an inch, and their transverse diameter to the 1/20th of an inch.

In certain cases the serum of the blood presents a milky appearance, and on being allowed to rest a creamy pellicle is formed on its surface. It is found to be composed of minute particles of oil, which resemble the smaller molecules found in milk and the chyle.

The blood has been observed to undergo other changes, observable by the microscope, in conditions of phthisis, fever, and some other acute and chronic diseases; these have not however been sufficiently accurately described to be relied on at present as a means of diagnosis.

4. Pus. It becomes sometimes a matter of considerable diagnostic importance to detect the presence of pus-globules in the blood. These are composed of mere granules or these have been mingled in a second membrane. At other times they are not perfectly globular, presenting a greater or less irregularity of their margins, and accompanied with granules and molecules. This occurs in pus from malignant ulcers and other kinds of what is called unhealthy pus.

5. Vomited Matters. It is frequently of importance to examine the matters thrown up from the stomach by vomiting. One of the most interesting results of the application of the microscope to these objects has been the discovery of a plant which has been called *Sarcina Venerilis*. Occasionally other forms of plants have been found in the vomited matters, although these have probably been introduced from without. In cases where poisons have been taken which produce vomiting, the application of the microscope will detect the kind of poison. In this way the husks of the ripe fruit of the Deadly Nightshade, the seeds and leaves of *Locelia subfusis*, and other poisonous substances, have been discovered. By the aid of the microscope, we can ascertain the nature of the food taken by children or insensible persons who can give no account of themselves, and this can be done by the examination of the vomited matters. In the stomach, the mucous surfaces of the stomach are affected with inflammation, and the discharges from the stomach will afford indications of the nature of the disease.

6. Feces. The contents of the bowels, when examined by the microscope, often afford important diagnostic indications. They contain naturally the matters secreted by the mucous membranes of the intestines and the remains of the food. They will also contain various morbid products. Amongst these latter may be mentioned plants and animals. Confera and fungi have been found in the feces, and various organic bodies, now known to be introduced from without, were at one time regarded as the cause of cholera. The presence of pus- and blood-corpuscles may also indicate diseases of the kidney, and the remains of epithelial cells of the membrane of the bladder. In cholera the rice-water evacuations consist of mucus and the remains of epithelial cells. The nature of the food in an injurious character may frequently be discovered, by the aide of the microscope, in the feculent matters.

7. Cutaneous Forms of Plants, belonging to the orders Conérfus and Fungi, frequently accompany diseases of the body. These are mentioned in the article *Erörosvita*, S. 2.
sclerotic heads of *Echinococcus* and *Oxyuris* can only be distinguished by the microscope, and are diagnostic of the nature of the cysts in which they are found. Among the articulated animals producing disease, and only to be detected by the microscope are the Scolex, producing the hook, and the *Dendroschistos follicularum* which inhabits the follicles of the skin.

9. Degenerated Tissues. — The tissues of the body are liable to have their normal constituents replaced by substances which are not natural. The nature of these degenerations can only be definitely made out by the aid of the microscope. Thus the muscular tissue is liable to have its sarcous elements replaced by fatty matter, causing fatty degeneration. In the heart, it becomes one of the most serious lesions to which this organ is subject, and is a frequent cause of fatal results. It has also been recently shown by Virchow and others, that starch is present in the tissues of the body, and to this form of degeneration the term amyloid has been applied.

**Diseased Secretions.**

1. Urine. — This fluid contains various salts and histological elements which can only be detected by the microscope. Many of these are very characteristic of diseased conditions. (Bairns's Diseases, S. 2; Microscope, vols. 1 and 2.)

2. Saliva. — This secretion shows various alterations dependent on disease of the mucous membrane of the mouth and tongue. The epithelial scales naturally found in the saliva are altered in their character and structure. Sometimes they are in large numbers, and in such cases are easily obtained from the mouth. The characteristic appearances of the fur on the tongue, under the microscope, is yet a desideratum in the practice of medicine.

3. Mucus. — This secretion is found on all healthy mucous membranes. When the membranes become diseased, this secretion is changed in its character, and various conditions indicative of the nature of the change may be observed under the microscope. In inflammatory affections, the so-called mucous-corpuscles, which resemble those in the urine, are increased in number. The mucus contains also epithelial cells, which may be changed in their character from morbid conditions. These corpuscles and cells are contained in a viscous fluid, which contains a very readily coagulable albumen.

4. Milk. — Diseased conditions of the milk can be determined by the microscope. In a healthy state it contains oil-globules which float to the surface of the liquid, and the whole of an inch in diameter. These globules are enclosed in a membranous envelope. In healthy milk they are of a perfectly globular form, and roll freely over each other. In unhealthy milk the globules are of various sizes, and when acid they run together in masses. A few days after the birth of the young, these globules are mixed with others of a larger size and a more variable size. They give the milk a yellow colour, and it is then called colostrum. They should disappear in the human milk the fifth or sixth day after parturition. If they remain longer, the milk must be considered unhealthy. Milk can be obtained from the mammary during the early months of pregnancy, and its peculiar characteristics are easily distinguished by the microscope. Under such circumstances it is called colostrum, and its history is of the greatest importance.

**Worms.** — The researches of Siebold, Küchmeister, Leuckart, Rainey, and others have recently thrown much light on the history and development of these parasites of the human body. The following is a classification of the various forms of worms found inhabiting the human body as given in Dr. Lankester's translation of Küchmeister's work on the Animal and Vegetable Parasites attacking the Human Body.

**Division Anthoidea.**

**Order Scolecod.**

**Section Platyhelminthes — Flat worms.**

Family *Taeniidae — Cestodae.*

- *Dionoeocephala latum* — Broad Tape-worm.
- *Taenia solium* — Common Tape-worm.
- *Taenia medinensis*.
- *Taenia nana*.
- *Taenia f (Cape of Good Hope).*
List of Mature and Immature Worms and their Habitats

<table>
<thead>
<tr>
<th>Immature State</th>
<th>Habitat</th>
<th>Mature state</th>
<th>Habitat</th>
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<tbody>
<tr>
<td><strong>Cysticercus cellulosae</strong></td>
<td>Pig</td>
<td>Adult</td>
<td>Sheep, ox</td>
</tr>
<tr>
<td><strong>G. fasciolaris</strong></td>
<td>Cat</td>
<td>Adult</td>
<td>Dog</td>
</tr>
<tr>
<td><strong>C. tenuis</strong></td>
<td>Monkey, man</td>
<td>Adult</td>
<td>Dog</td>
</tr>
<tr>
<td><strong>S. cerviolaris</strong></td>
<td>Cattle</td>
<td>Adult</td>
<td>Man</td>
</tr>
<tr>
<td><strong>S. cysciolus</strong></td>
<td>Man, domestic cats</td>
<td>Adult</td>
<td>Man</td>
</tr>
<tr>
<td><strong>C. bovis</strong></td>
<td>Cow</td>
<td>Adult</td>
<td>Dog</td>
</tr>
<tr>
<td><strong>C. oviformis</strong></td>
<td>Sheep</td>
<td>Adult</td>
<td>Dog</td>
</tr>
<tr>
<td><strong>Echinostoma internum</strong></td>
<td>Man, ruminants</td>
<td>Adult</td>
<td>Man</td>
</tr>
<tr>
<td><strong>E. multilocularis</strong></td>
<td>Ruminants</td>
<td>Adult</td>
<td>Man</td>
</tr>
<tr>
<td><strong>X. scolopes</strong></td>
<td>Sheep, ox</td>
<td>Adult</td>
<td>Dog</td>
</tr>
<tr>
<td><strong>P. laevis</strong></td>
<td>Fresh water mussels</td>
<td>Adult</td>
<td>Sheep, man</td>
</tr>
<tr>
<td><strong>T. echinococcus</strong></td>
<td>Man</td>
<td>Adult</td>
<td>Sheep</td>
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The practical conclusion to which these researches lead, is the necessity of preventing the introduction into the system of the egg-shells or of the various forms of tape-worms which produce the cystic and uterine states of the worm, are introduced into the stomach by water, salads, and all kinds of unclearly food. The cystic worms themselves are introduced through the medium of raw or partially cooked flesh, especially pork, which should be carefully avoided.

PIECENING. [Yorkshire.]
PIECINE. [Chemistry, &c.]
PIECIND. [Chemistry, &c.]
PICEE. [Chemistry, &c.]
PICKTON. [Canada, &c.]
PETERMARITZBURG. [Natal, &c.]
PICKLY. [Chemistry, &c.]
PICTURE. [Chemistry, &c.]
PICT. [Fiji.]
PISSFANT. [Mineralogy, &c.]
PISTIBLIS. [Mineralogy, &c.]
PICTORINO. [Mineralogy, &c.]
PICT. [Florida.]
PISTOPLANE. [Mineralogy, &c.]
PICT. [Flour.]
PICT. [Gum.]
PLASTER OF PARIS. [Gypsum.]

PLATA, LA, STATES OF. The historical notice of the Argentine Confederation has been brought down to 1836 [Planta, La], when Rosas had been created governor, or captain-general, with almost dictatorial power. By this arrangement the provincial government of Buenos Ayres was invested with extraordinary powers, and temporarily charged with the transaction of all matters appertaining to the common interests of the confederation, and the carrying out of its business with foreign nations. Rosas had previously served as governor and captain-general of Buenos Ayres for the usual term of three years, and had obtained unrivalled influence in that province, chiefly through his military powers, as displayed against the Indians. His decision and energy secured for a while internal peace, and the province began to recover from the effects of the long prevalent anarchy. But cruelty and despotism marked his sway at home, and his ambition, which continually prompted him to extend his power over the provinces, was opposed by the whole country, watered by the Plata and the Paraná, led him into disputes with foreign powers: and these ultimately brought about his downfall. His commercial policy had for its object to secure to the Ayres the monopoly of the trade of the Plata, his political policy to obtain a like territorial superiority. On the death of Francis, dictator of Paraguay, he refused to acknowledge the independence of that power, insisting that it should join the Argentine Confederation, at the same time to render to the navigation of the Paraná by vessels bound to Paraguay. Lopes, the new dictator of Paraguay, therefore entered into alliance with the Banda Oriental, now called Uruguay, with which Rosas was at war. These powers applied for assistance to Brazil. The war was prolonged, and hostilities were opened against the Plata and the Paraná was in a state of confusion. On the earnest appeal of the merchants and others interested, Great Britain volunteered her mediation, but it was rejected by Rosas who marched his troops within a few miles of Monte Video, which was then the same as the capital of the Plata. The emperor of Brazil now interfered, and sent a special mission to request the interposition of the courts of London and Paris. The British and French governments in February, 1846, decided on the 28th of March to send their ambassadors to the Plata to offer mediation, and to announce their intention to enforce a cessation of hostilities if needful, by an armed intervention. The offer was rejected by Rosas, but readily accepted by his opponents. The united fleet of England and France at once commenced operations by seizing the fleet of Rosas which was blockading Monte Video, and the island of Martin Garoé which commanded the entrances of the Paraná and the Uruguay. The harbour of Buenos Ayres was at the same time declared under blockade, and an appeal was made to other nations. The offer of mediation was refused by Corrientes any merchant vessels that might desire to ascend that river. Rosas on his part made hasty preparations to intercept the fleet by planting batteries with parks of heavy artillery at the mouths of the river. The British fleet was, however, the first to pass down the river, supported by 24 vessels and 10 fire-ships. On the 10th of November, 1845, the combined fleet consisting of eight sailing and three steam vessels forced the passage with trifling loss to itself, but entirely destroying the batteries, and expelling the enemy from the mouth of the river. On the 13th of that month, the fleet, with a convoy of 110 vessels, it was encountered at San Lorenzo by a very powerful battery which Rosas had erected in an admirable position, in the full expectation of stopping the passage of the British fleet. One of the number of the Prima, and crippled the naval force. The battery commanded the river, and was difficult of attack by the steamer, but it was speedily silenced by a rocket-bridge, which had been the previous night secretly landed on a small island in the river. The combined fleet escaped with trifling loss, the rocket-bridge lost not a man; but four of the merchant vessels which, through unskilful pilotage, ran ashore, were burnt to prevent them falling into the hands of Rosas. The loss to the Argentine army was very great. Again fleet of merchant vessels were destroyed, and Rosas was forced to yield; and England withdrew from the blockade in July, 1846. It was however continued by France until January, 1849. On the final withdrawal of the two great powers in 1850, Rosas the dictator of Paraguay, in active conference. The armies of Rosas, essentially despotic, and devoted to the maintenance of the supremacy of Buenos Ayres, had moreover become intolerable to the provinces which desired a federal and equal union. Accordingly, towards the close of 1850, Brazil, Uruguay, and Paraguay entered into a treaty, by which the Corrientes and Entre Rios, as represented by General Urquiza, became parties, by which they bound themselves to continue hostilities until they had effected the deposition of Rosas, whose power and tyranny they declared to be "incompatible with the peace and happiness of this part of the world." Early in the spring of 1851 a Brazilian fleet blockaded Buenos Ayres, and soon after an Argentine force commanded by Urquiza crossed the Uruguay. The struggle continued as usual, and Rosas, when asked whether he had hoped to bring the army of Rosas in Monte Video, made a show of resistance, but it was merely to gain time in order to complete his arrangements with Urquiza, and he soon after capitulated. His soldiers for the most part joined the army of Rosas, who at the head of a force amounting to 30,000 men, crossed into Buenos Ayres. A general engagement was fought on the plains of Moron, February 2, 1851, when the army of Rosas was entirely defeated. Rosas, who was entirely surrounded by the enemy, committed suicide, and the army was taken, and the field and, in the dress of a peasant, he reached in safety the house of the British minister at Buenos Ayres. From thence, with his daughter, he proceeded on board H. M.'s steamer Locust, and on the 10th of February sailed in the Conde de Monteleone for the French island. But the fall of the tyrant did not bring peace to the unhappy country. Urquiza, by the governors of the pro-
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vinces assembled at San Nicolas, was invested with the chief power; and appointed Provisional Director of the Argentine Confederation. The radical faction and the wealthy people of Buenos Ayres, however, declared against him, and protested against the proceedings of the convention, on the ground of the superior privileges of Buenos Ayres being nullified. Uruguay dissolved the Chamber, and insurrection broke out. Civil war commenced with the declaration of war in February, 1813; but on the 20th of December, 1814, the separation of Buenos Ayres from the other states of the Argentine Confederation was settled by treaty; and it has since been acknowledged as a separate state, with a liberal constitution, and independent of the Spanish government. The republic of Buenos Ayres is briefly described under Plata, as one of the provinces of the Argentine Confederation. The capital city is described under Buenos Ayres. See Nicolau de los Ríos.

They are natives of the Levant and North America chiefly. They are fine trees, but their timber is not durable.

There is but one genus (Platanus) in the order and six species. [Platanus.] The family resembles Artocarpaceae and Althaeaceae.

P. PLATANIERA. [Tortoise.] PLEADING, AT LAW AND IN EQUITY. Although modern Statutes have made several alterations in the procedure of the Superior Courts both of Law and Equity, the outline of the system of pleading in use in those Courts, which is derived from the Customary, and which is said to be the law of England, is still substantially accurate. The more important changes effected in the procedure of the Common Law Courts have been mentioned under ABSTAINMENT [S. 2], IMPROVEMENT [S. 2], and MAGNUS [S. 2]: those in the Court of Chancery under EQUITY [S. 2]. It may be added here that the system of pleading devised for the new Courts of Probate and Divorce, is of the nature of that now in use in the Courts of Common Law.

For the most part the genera of Plants belonging to the alliance Algae, the order Ceramiales, and the sub-order Sphaerococcus. One of the species, P. Helminthocoron, is called Corsican Moss, and has a considerable reputation as a vermifuge. It is a native of the Mediterranean.

P. PLATYTOPHORA. [Flag.] PLUNKETT, WILLIAM CONYNHAM, 1st Lord Plunkett, of Newton, County Cork, was the second son of the Rev. Thomas Plunkett, a Presbyterian minister at Ennis, in the county of Clare; his son William was born in July 1764. Having some scruples as to the received doctrine of the Trinity, the elder Plunkett removed to Dublin, where he became minister of the Strand-street chapel. His eldest son practised for many years as a physician in that metropolis, and bequeathed to his brother a large library and a considerable fortune. William was still a boy when his father died, leaving the care of his family to the priest and zeal of his congregation. His dying request was not in vain, and the same received by their assistance a good education. William was in 1783 appointed to the regency of the public scholarship and a degree, and where he was the friend and contemporary of the late Dr. Magee, archbishop of Dublin. Mr. Plunkett was called to the bar in 1787. He had already gained some reputation by his speeches delivered in the debating club of the university, now known as the Historical Society; and the late Earl of Charlemont soon afterwards introduced him into the Irish Parliament, as member for the borough from which he derived his title.

In the ordinary course of his political career by bold and sarcastic oratory, retaining himself almost entirely for great occasions. Hence his name is but little associated with the everyday business of legislation; the fame which he acquired in the Irish Parliament is principally connected with the seats which he opposed to the Whigs in the Irish Union in 1800. The vehement oratory with which he de- announced the ministry on this occasion, proved the means of increasing his professional engagements in the Irish courts of law. His exertions were rewarded with the chancellorship of the diocese of Ardfert in 1801. His professional honours were handsomely repaid, with liberal interest, the contributions of his father's congregation which had been the means of enabling him to get a start in life. About the same time he married Catherine, only daughter of John Macaulay, Esq., who had repre-

When the rebellion of 1798 broke out, Mr. Plunkett gave the aid of his professional talents to its victims, and indeed was at one time so intimate with Robert Emmett and his associates, that he was publicly accused of being concerned in their unhappy proceedings. The accusation however was shown to be unfounded.

In 1803 he was appointed solicitor-general for Ireland, from which post he was promoted in 1806 to that of attorney-general for the united provinces.

Wellington at their head, came into office, and he determined to throw in his lot with them. Accordingly he retained the attorney-generalship under their administration; whose well-known views offered an opportunity for the Catholic Association to press upon their notice the importance of granting Roman Catholic emancipation. Of this subject, Mr. Plunkett was always an able and energetic advocate. The death of Mr. Fox having broken up the Grenville administration in 1807, Mr. Plunkett, in the House of Commons, which he had once secured for him a high reputation, Mr. Canning affirmed, that it brought back the days of Burke and Pitt, of Fox and Sheridan. In 1822 a number of ministerial changes took place on the death of the Marquis of Londonderry, and Mr. Plunkett was appointed attorney-general for Ireland, the late Marquis of Wellesley being lord-lieutenant, and in that capacity he was engaged to prosecute on behalf of the crown a large number of the Dublin Orangemen, and some of the insurgents in the south of Ireland. Early in 1827 Mr. Canning proposed to appoint Mr. Plunkett master of the rolls in England, but the intention was ultimately abandoned. In the following June however he was elevated to the post of lord chief-justice of the common law courts of Ireland. On the death of Lord Donum. He held the chief-justice'ship for three years, and resigned it at the downfall of the Wellington administration. His judicial career was not marked by any great brilliancy or success, which indeed there were no remarkable or stirring events to call for, until it was removed, or the House of Lords, where he sat by the Duke of Wellington, at his Grace's special request, to advise with him at every step of the Roman Catholic Emancipation Bill, of which he 'took charge' in his passage through the Upper House.

With the passing of this measure the political career of Lord Plunkett may be said to have closed, though he was appointed Lord Chancellor of Ireland by the ministry of Earl Grey at the close of 1830. This post he occupied for eleven years, with the brief interval of a few months in 1834-36, during which the seals were held by Sir Edward Sugden (now Lord St. Leopards). He ultimately only resigned the chancellorship a few months before the removal of the Liberal administration of Lord Melbourne from office in 1844, when his place was immediately passed to Lord John Russell, in order to make way for Lord Campbell. During his later years Lord Plunkett had almost wholly retired from political life, and indeed for several years before his death he had not come over to England to take his seat in the House of Lords, but spent his declining days in the enjoyment of the society of his family and private friends, at his country villa near Bray, where he died on the 4th of January 1854. His eldest son, now second Lord Plunkett, is also Bishop of Tuam.

On the other hand he was bountiful to Lord Plunkett, and accident favoured him at almost every step of his long and brilliant career. He was sixty-six years of age when he took his seat in the Irish Court of Chancery, and it could scarcely be expected that his prospects would have been equal to his previous fame. His reputation shot upwards from a narrow ground-work. His speeches were at once few and famous;
they excited the unqualified applause of his contemporaries, and his name is still foremost among the orators of the 19th century. But the great principles of legislation, which men seek and find in the speeches of Pitt and Burke, are seldom met with in the startling orations of Lord Flunkett. His chief triumphs were as a lawyer and not as a statesman. He was an able and experienced practical politician; and there were able judges and more learned men than himself among his brethren on the Irish bench, though probably there were not so many of the more constructive eloquence.

POE, EDGAR ALLAN, was born at Baltimore, in the United States, in January 1811. He was descended of a good family, but his father and mother, who had become strolling players, having died when he was quite a child, he was brought up, after a while, by his maternal uncle, who had known his father, and having no children of his own, treated him as his son. In 1816 Mr. and Mrs. Allan brought him to England, where he was put to school at Stoke Newington. He returned to America in 1822, was first placed in an academy at Richmond, in Virginia, and thence sent to the university of Charlottesville in the same state. At all these places of instruction his progress was rapid, and he held a high rank as a scholar, but his extravagance was so great, and his conduct so licentious, that he was expelled from the university. He returned home, and on Mr. Allan refusing to honour some of his drafts for gambling debts incurred at the university, he wrote a satirical and abusive letter to his benefactor, left the house, and set off to Greece to make his fortune.

But Greece had never reached Greece, but after wandering about Europe for nearly a year, he arrived at St. Petersburg, fell into the hands of the police for a drunken riot, was rescued by the intervention of the minister of the United States, and by him sent back to America. Here he became the patron of such of his housemates as he liked, and as he now expressed a desire to adopt the military profession, he procured him the appointment of a cadet in the Military Academy at Westpoint in New York. Here, after a short period of academical application, his old habits returned, and within a twelvemonth he was cashiered for insubordination and drunkenness. He returned to Mr. Allan at Richmond, who again received him with kindness, but that gentleman having married a second wife, Poe satirized both him and his wife so severely that he was forced to quit that place of refuge, nor would Mr. Allan ever see him again or assist him any further. He had by this time published a small volume of poems, and from the favourable reception they had met with, he thought he might support himself by his pen. He failed, and enlisted as a private soldier. From this situation he was rescued by some military friends he had made at Westpoint, who procured his release. He again had recourse to his pen, and this time with more success. He contributed to various periodical works, with some as contributor, and with others as editor; but his irregular habits constantly prevented the engagements being permanent. He followed this course at Baltimore, Richmond, Philadelphia, and New York, where he arrived in 1844. His love of literature led him to think of his own employment, while his intemperate and immoral habits as necessarily occasioned his dismissal. In 1848 he gave a series of lectures in New York on the universe, which were afterwards embodied in a work entitled 'Eureka, a Prose Poem.' In the autumn of 1848 he joined a temperance society, but this could not save him. He went in 1849 to Virginia to deliver lectures, and on the 4th of October he set out on his return to New York. At Baltimore he met with some who inveighed against him as an intemperate man; and having failed to get his pledge, became so terribly intoxicated that he was picked up in the street, carried to a hospital, and died the following day, October 7th, 1849. His works, as may be supposed from the previous sketch, consist wholly of short pieces. He wanted the steadiness and perseverance to produce anything worthy of his genius; but they exhibit in a remarkable degree the possession of faculties of a high order. In his youth the magnificence of imagination and description — a remarkable faculty of anything that was waste upon trivial subjects; a love and an acute observation of nature, and an admiration of the beautiful, which it is remarkable in such a man never descends into the sensuous; combined with a gypsy and mystical sublimity in some of his fictions that is done by the most sublimity in some of his fictions that is done by the most

POLAND. The Emperor of Russia, by a ukase, dated August 25th, 1861, has ordered the Pacific Divisions, exclusive of the city of Warsaw, which are governed in the same manner as the other provinces of the empire, each having a military and a civil governor. The following table shows the area and population of the present divisions according to the official returns for the year 1866:

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<th>Government</th>
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POLAR COUNTRIES AND SEAS. The countries and seas which lie between the northern coasts of America and the North Pole are noticed in the article North-West Passage, S. 2; those which are situated on the other sides of the North Pole are described under their respective names. [Greenland; Iceland; Spitzbergen; Nova Zembla; Spitsbergen; Nova Zembla, S. 18.

The seas which surround the North and South Poles are named the Arctic Ocean or North Polar Sea, and the Antarctic Ocean, or South Polar Sea. The two oceans are bounded by two imaginary circles which surround the globe at about 60° 90° N. lat. and 90° S. lat. Of the two oceans themselves there is only one day of six months, during which the sun never sets, and one night of six months, when the sun never rises. In the spaces comprised between the Polar Circles and the Poles the quality of continuous day and continuous night vary according to the distances from the Poles. Thus, at the north point of Nova Zembla, 75° N. lat., there is uninterrupted light from May 1st to August 12th, and uninterrupted darkness from November 8th to February 21st. At the Arctic Circle, the light is 24 hours at the summer solstice, and Midsommer's Day, whilst, at the same time, at the Antarctic Circle, the sun is 24 hours below the horizon; and the reverse at the opposite seasons of the year. The general coldness of the Polar Regions, as also of the Antarctic Circle, makes it necessary to produce anything that is done by the most sublimity in some of his fictions that is done by the most
senting an impassable barrier. On entering the Arctic Ocean from the Pacific through Behring's Strait, the most daring and skillful navigators have not been able to penetrate much farther in a northern direction than 70° N. lat. Captain Chastellain's ship, for instance, struck on the banks of the Strait, sailed as far westward as North Cape, 180° W. long.; but here the masses of ice prevented any farther advance. If the navigator, after passing through Behring's Strait, turns easterly, he will reach a passage, called the Bering Sea, and the pack-ice, a narrow passage, much encumbered with broken ice, and may thus with some difficulty reach the most north-eastern point of the American continent; or, having reached Bering Island, may turn northward and try to advanced along the coast of Asia. Passage by following either of the tracks of Captain McClure.

The great entrance to the Arctic Ocean by the Spitzbergen Sea is not attended with much difficulty. Ships sail every year from the shores of the Atlantic Ocean to the Spitzbergen Sea, and must necessarily pass round North Cape, 71° 10' N. lat.; other vessels proceed annually to fish for whales, which they never expect to take south of about 75° N. lat.; and others much smaller go every year from Hammerfest and other places to fish for walruses along the western shores of Spitzbergen. Barents, the Dutch navigator, in 1594 and 1596, traced the western shores of Nova Zembla as far as North Cape, 75° N. lat.; and the Russian navigator Ziwolks, who in 1536 surveyed the island of Nova Zembla, found no difficulty in passing through the eastern coast to 61° E. long.; but impenetrable masses of ice prevented his advance farther to the east.

The greater or less severity of cold in the Arctic Sea seems to be connected with the latitude or difference in degrees of latitude. Thus, on the European side of the Polar Basin, the navigation, as has been shown, is open as far as 80° N. lat.; on the Asiatic side it is generally closed by masses of ice; on the American side the cold is very severe, and the navigation is not possible. The ship's passage is most dangerous in the several sounds and bays, which are connected with the open sea by narrow passages, e.g., the Davis Strait, the Bering Sea, which is open to communication with the Pacific Ocean; the Fox and Lancaster sounds, which are connected with the Atlantic Ocean, the Spitzbergen Sea, and the Barents Sea; the Sound of Spitsbergen, which is connected with the North Pole, etc. For the coast of the Spitzbergen Sea is mad.

The enormous and constantly increasing ice-drift towards the North Pole, and the enormous and constantly increasing accumulation of ice in all the seas in the northern hemisphere, is the most terrible fact of the cold, that has been proved by the observations of Captain Barrow, and other navigators, that have passed through the北极, and been arrested by the ice. In the summer of 1859, the ice-drift was so strong that the ships were carried over the North Pole, and were stopped by the ice. In the summer of 1860, the ice-drift was so strong that the ships were carried over the North Pole, and were stopped by the ice. In the summer of 1861, the ice-drift was so strong that the ships were carried over the North Pole, and were stopped by the ice. In the summer of 1862, the ice-drift was so strong that the ships were carried over the North Pole, and were stopped by the ice. In the summer of 1863, the ice-drift was so strong that the ships were carried over the North Pole, and were stopped by the ice. In the summer of 1864, the ice-drift was so strong that the ships were carried over the North Pole, and were stopped by the ice.
Bourbon. "At last," says Polovoy in the autobiography prefixed to his 'Ocherki Russkoy Literatury', published in 1899, "I became my father's walking dictionary in geography and politics, and at that time I was never met with in anybody else. To learn by heart a whole tragedy cost me nothing. In a word, if I must describe my mental progress up to the year 1811, it was this: I had read about a third of the Russian authors, and remembered all that I read from the verses of Karamzin, and the articles in the 'Courrier de Europe' (a Russian Magazine), to the Chronological Tables and the Bible, from which I could repeat whole chapters by heart. I was known in the town of Kursk as the boy who made a collection of public laws. I was almost in constant movement from St. Petersburg to Irkutsk, and from Irkutsk to Irkutsk, and his literary ardour, deadened by the reproaches of his father, who now wished him to turn his head to another occupation, appeared as though it had been but but extinguished. It suddenly revived when he was about eighteen, a clerk at Kurk; but the main cause of its renewal, according to his own account, was his discontent with the then situation and its limited prospects, and his conviction that in Russia there was no other way to consideration for a person in his position but through learning and literary success. Himself and his younger brother, Xenophon, began to study French and German in secret, devoting many hours of the night to these two noblest of all the foreign languages, which he called his "so-called" languages, and this new world of reading, in 1817, when the Emperor Alexander paid a visit to Kurk, Polovoy sent to the 'Russian Courier' an article describing the event, and had the pleasure of seeing for the first time his name in print. Other contributions followed, and the name became known; on a visit to St. Petersburg he was introduced to Zhakovskoy, Gribiyedov, Grech, and Bulgari; and in 1820 he commenced at Moscow the publication of a magazine entitled the 'Moscow Telegram'.

For the twenty-one years that followed, Polovoy was in incessant literary activity. The 'Moscow Telegram' soon made itself conspicuous by the vigour and spirit of its remarks on the literature of the day; the example was extended by the more liberal Russian literary associations, and an era of new criticism in the articles of Polovoy and his friends naturally supposed that the editor had little spare time at his disposal, but the public was surprised to hear in 1829 that he had completed a history of the Russian nation, in 12 vols., containing a continuous narrative from the earliest times to the reign of the Emperor Nicholas. The early volumes of this history were assailed without mercy by many who were astonished at the presumption of its author in measuring himself with Karamzin, and of the twelve volumes only six appeared in print, the last in 1833. Possibly its further progress may have been checked by the censorship, as the 'Moscow Telegraph' was thought too liberal in its tendencies, and suppressed by the Russian government. This was in or about 1835. Polovoy removed to St. Petersburg, and his activity, instead of slackening, became greater than ever. In Moscow," says Nikitenko, in an article on his work in the 'Biblioteka dlya Chit'ennyaya' for 1848 (vol. xxvii.), 'Polovoy was a journalist, an historian, a romance-writer. In St. Petersburg, the man of all kinds of words, and contributions to several journals; he composed romances, tales, essays, translations from Shakspeare, and such a multitude of dramas, tragedies, comedies, vaudevilles, national fables, and so on, that no one attempted to follow him. We do not know what to most astonishing of all, the breadth of his knowledge, the range of his materials, the variety of their character, and the rapidity with which he threw them off.' The natural result of his rapidity was, that the name of Polovoy, which at one time promised to be one of the brightest in the Russian literary horizon, lost much of its lustre. For the last ten years of his life his reputation sank instead of rising. He died at St. Petersburg, on the 33rd of February 1848 (a. s.), after three weeks of fever, and was for a time neglected. His funeral was completely wrought by his incessant literary labours. He died in poor circumstances, and left a large family.

The most interesting work of Polovoy is perhaps his 'Ocherki Russkoy Literatury,' published in the 'Russian Literature,' 8 vols., St. Petersburg, 1839. It consists of reprints of select critical articles which had appeared in the 'Telegram' and elsewhere, on Devzhavin, Karamzin, Pushkin, and other of the most prominent names in Russian literature. It contains a fine collection of documents, of which the best is perhaps the statement of N. A. Polovoy ('Dramaticheskoe Sochenieniya i Perevody'), 4 vols., St. Petersburg, 1842-43, comprises only the more popular of his productions, several of which enjoyed a great success. In particular, the 'Grandfather of the Russian Fleet' ('Diedushka Russkogo Plota'), founded on the history of the old boat which bears that name, which Peter the Great took as the model for his ship-building. The author's favourite, as he tells us himself, was 'Parasha Siberichacka' ('Parasha the Siberian Girl'), founded on the same historical anecdote which supplied Madame Cottin with the groundwork of 'Elizabeth, or the Exiles of Siberia.' In another play, 'Boldatskasoe Ser'dce' ('A Soldier's Heart'), the hero is his still-living friend Bulgarin, on a real incident which occurred at Tula, during the war with Prussia, which was produced at Moscow in January 1837, is unusually close to Shakspeare; not even the scene of the gravediggers is omitted, and the dialogue passes from blank verse to prose, in such a manner that the two forms of versification are far from successful. His 'Life of Eurowor,' or Sowarrow, is a very popular book in Russia. His 'Life of Peter the Great' (4 vols., 1843), is the best biography of that wonderful man the Russians yet possess, and superior beyond all comparison to the tedious compilation of the author's kinsman Golikov. His 'Life of Napoleon' (6 vols.) was only brought by himself to a point a little beyond the confabulation of Moscow, and was finished after his death by his brother. By his own account, his 'Polevoy' ('The Wind of Russia'), or an historical picture of Russia from 1745 to 1845 (2 vols., 1840), is perhaps the least satisfactory of his historical works, but it contains passages of interest to a European reader.

Though the 'Moscow Telegraph' was suppressed in Polovoy's hands, and its author is spoken of by Hertzen as having the reputation of a decided liberal, his patriotism as a Russian is one of the qualities which most forcibly strike the attention of a foreigner. "Russias," he exhales at the beginning of one of his contributions, "is not a Roman empire, not violently put together like the dominions of Napoleon, not scattered over the whole world like the British sovereignty, the three examples of vast empires composed of different barbarous parts, brought together in one mass. . . . Russia like the ocean in which it stands, and what surrounds it, and what its waves have covered becomes its incontestable dominion—no human force shall tear from its subject provinces. "Assuming the title of Emperor in place of that of Tsar, moving the capital from Moscow to St. Petersburg, shaving beards and shortening caftans, altering manners, customs, and laws, it was after all from the original elements of the Russian empire, from the Russian mind and the Russian soil, that Peter the Great reconstituted Russia. He still remained a Russian sovereign, and his subject, though fraternizing with the German, remained a Russian man. With his decided tendencies towards western Europe, it was impossible that something superfluous should not find admirers, that this element should not remain till even now, but they are perishing and will perish, as the Gallicisms die out of our Russian tongue." . . . "And sixty millions of a nation like this, fastened together by one power and inspired with faith in that power, are directed by hundreds of ringleaders, and contributing in all as well as of Russia. Will not these sixty millions do! The future belongs to us. Whence otherwise comes the fear with which we inspire Europe and the West, the fear from which it strives to remove itself by calumnies against us. This fear takes rise from a numerous and very strong, which in the future, from a feeling different from that of hope in the future, on which we Russians look with such boldness and such faith." POLICE. The establishment of a police force all over England has at last been made compulsory by the Statutes.
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POL 19 and 30 Vict. c. 69; which subjects the whole force to the inspection, and, to some extent, control of the Secretary of State for War, and, in case of violation of the regulations, the police of any county or borough must be paid by the Treasury, when the force has been certified to have been maintained for the previous year in a state of efficiency in point of numbers and description. (Blackstone's Commentaries, 3d ed. i. 243.)

POLISHING SLATE. [Minerality, S. 1.]

POLPERO. [Cornwall.]

POLYERGUS, a genus of Formicidae, separated from Formica by Latreille. The type of the genus is F. rufescens, the Amazon Ant. These ants are destructive of stumps, and have the antennae near the mouth and the mandibles narrow, curved, or very much hooked. The habits of the Amazon Ant, F. rufescens, are very remarkable. The neuters of this species, as well as the males, are very much addicted to vinegar, and, when present, were always accompanied by the neuters of other species of Formicidae, especially C. curlicularia and F. fusca. The result of the conquest is the making slaves of the latter, who are always found doing the hard work of the colonies of their enslavers. [Avr.]

POLYPTERUS, a genus of Fishes belonging to the family Clupidae. The sides of the upper jaw are moveable; the head is covered with sharpened bony plates; the body with strong scales; it has one gill-ray; a number of separate fins on the tail; the eyes are on one side; it has a large mouth; a large double air-bladder, with large lobes, the left one opening freely into the gill-trough. There are two species; one found in the Nile, the other in the river of Azara, both of which can live several hours out of water. The living representatives of a large family now extinct. They belong to the large division of extinct fish called Sauroid, on account of their resemblance to the Lizard tribes.

POLYZOA, frequently termed Bryozoa, are animals belonging to the Molluscan Sub-Kingdom, and nearly allied in some respects with the Tunicata, and especially with the Compound Ascidians, whilst in others they approach the Brachiopoda.

The analogies presented in their structure with that in other Molluscan groups having been pointed out in the article Mollusca, S. 2, it will be needless here further to refer to them. The present article, after giving a brief view of the more important structural peculiarities of the class, will be devoted more especially to their mode of classification; but since the term Polyzoa, here employed, has by no means obtained universal adoption, it appears requisite to say a few words explanatory of the reasons which have induced us to prefer that term to the name Bryozoa, more usually employed by many British and by most Continental naturalists.

Section I. Historical.

Formerly confounded with the Suctarian and other phyla of the same order, it is only since the last thirty years that the Polyzoa have been admitted to their proper place in the animal kingdom, having been advanced in fact from one sub-kingdom to another. Their advance from the Radiata to the Molluscan may be said to date from the researches of Dr. Grant, contained in his Observations on the Structure and Nature of Flustra, in 1837; and of Milne-Edwards, in conjunction with M. Audouin, given in their Résumé des Recherches sur les Animaux sans Vertèbres fauteaux iles Chasséan, in 1838. To the former of these observers we are indebted for the first full intimation of the characters in any number of these creatures—among others, of the existence of ellia on the tentacles, and the curvature of the intestinal canal, with other particulars of less importance. He failed, however, to notice the existence of a second and oral orifice to the intestinal canal; a fact of the highest importance, as indicating in that respect their close approximation to the Arcidae, or tunicate molluses. This opening was discovered by Milne-Edwards and Audouin, and its importance vol. i. p. 303, and has ever since been daily appreciated. In other respects their observations agreed with those of Dr. Grant. The existence of this oral orifice was regarded by its discoverers as sufficient to justify a complete change in the idea of the animals under discussion, and to confer on them the affinities of these animals with the rest of the Zoophytes. They proposed to distribute the animals belonging to the class of Polypia, as then received, into four principal groups, which are in fact pretty nearly identical with those in which they are at present most generally placed. The fourth of these families contained the Flustra and other Polypia whose digestive canal opened on the exterior by two distinct openings, and whose organisation approached that of the Cephalopoda.

The latter class, though thus distinguished from its apparent allies, received no name from the eminent naturalists to whom its foundation was due; and of the names subsequently applied to it, it remains simply to determine which is entitled to have the preference. The Polypia was the name given by Mr. V. Thompson to this class of animals, which in all the specimens which have been examined under the name of Polypia hitherto in great measure confounded with the Hydroidea. This paper was published in December, and probably on the first of December, 1830. The appellation of Polypia by Audouin and Milne-Edwards, to those Polypia in which two openings existed to the digestive canal, and which he thus distinguished from a second class, termed by him the Anthozoa, in which but one orifice was presented. His paper on the Corals of the Red Sea, in which this subdivision of the Polypia was first proposed, was read, or rather was in part read, before the Berlin Academy, on the 3rd of March, 1831. It was not completed, however, till December, 1833, nor published until February, 1834; and this date, for reasons it is needless to enter into here, may be regarded as the true date of its publication. The part of the same writer's 'Symbole Physique,' in which the term is used, was not published till June, 1831. Consequently, the earliest date of discharge of any work in which the term Polypia is used is the first publication of the term Bryozoa, in March, 1831, or at least three months after that of Mr. J. V. Thompson's 'Researches,' in which that of Polypia is proposed. In a very valuable paper published in the Philosophical Transactions for 1834, Dr. A. Fraser proposed the term Oolithoideas for this class of Polypia, from the circumstance that their tentacles are ciliated. But this term, though appropriate and good, has since been but rarely employed, and is obviously without any claim to priority.

Section II. Structure and Functions.

The main points in the anatomy and structural relations of the Polyzoa will be found under the article Mollusca, S. 2; but in order to render the account of their classification (which is properly the subject of the present article) more intelligible, it will be necessary briefly to detail the structural, and with them some of the physiological conditions presented in the soft parts of these animals.

The Polyzoa may be defined as Compound Molluscan Animals, in which the nervous system consists of a single ganglion, situated between the mouth and the anus, having a distinct mouth surrounded more or less completely by a row of tentacles or cirri, which can be extended or retracted by buds or ovaries; in the mature state mostly fixed, though some possess the power of locomotion.

Though differing widely in external appearance, the animal itself is constructed upon a very uniform type throughout all the subdivisions of the class, and for this reason, the anatomy of some species or order will, with trifling exceptions, apply to all. The following account of their structure is, in great measure, taken from that given by Professor Allman in his Report on the Freshwater Polyzoa, published in the Proceedings of the British Association 'for 1830; and, with the exception of the word 'polyzoary,' or 'polyzoarium,' which is here used to express the compound growth formed by the associated animals, instead of 'caecumium,' proposed by that naturalist, the terms used by him have been adopted—

1. Polypia, to signify the soft or retractile portion of the Polyzoa. 2. Ectocyst and Endocyst, to express the two distinct surfaces of which the cells of the polyzoa are formed; and from the former, the external, to the latter, the internal. 3. Three or the exception of the word 'polyzoary,' or 'polyzoarium,' which is here used to express the compound growth formed by the associated animals, instead of 'caecumium,' proposed by that naturalist, the terms used by him have been adopted—

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Mouth, or that opening, as it may be termed, through which the polypide makes its exit and its entrance. The borders of this opening are sometimes furnished with Oral Spines, and it is sometimes closed when the creature has retreated into the cell, by a Crescentic Lip, usually having a cartilaginous border, and secreted by special muscles. (Figs. 5 and 6, &c.)

In many cases the wall of the cell is of equal thickness and similar structure throughout, but in the Cheldestomata sub-order the front of the cell, or that side upon which the mouth opens and the animal comes out, very often differs from the rest. That is to say, a greater or less extent of the front may remain wholly or in great measure membranaceous, as in the genus Membranipora (fig. 14); or it be filled in by a sculptured or perforated calcareous expansion, as in Catenicula (fig. 1, b), Lepora (fig. 1, a), &c. The former constitutes a sort of inflated mantle or the other kind of a long, slender, moveable seta. However diverse in appearance, these two kinds of organs are all constructed upon the same general type; that is to say, the organ consists of a hollow stem, or cell, containing two sorts of muscles, for the movements of the mobile limb, the mandible, as it is termed, in the one case, and the seta in the other. The avicularia again are either pedunculate and moveable upon the peduncle, or sessile, which latter may be either simply sessile or deeply imbedded. The former is a sort of an arched or globose or pyriform shape found on many of the Chelostomata and on some of the Cyclotomata, apparently destined for the development of ova. In the former class it is invariably situated above the mouth; and in the latter the analogous organ seems to represent a metamorphosed cell, and in situation corresponds with the other cells of the polypide.

The importance of the avicularia and the visceral organs, in a systematic point of view, may be estimated from the circumstance that, out of 36 genera of Chelostomatous Polyzoa, 26 include species armed with one of the other, or with both; and that of 101 species no less than 128 are furnished with both. They appear to be confined solely to the Chelostomata.

In many cases the polypide is lined by numerous alenader corneous tubes, which seem to be merely subservient to that purpose; these are termed Radical Tubes.

The species itself is an aggregation of an aggregation of cells, which throughout the two former orders of the class as here arranged, arise one from another, either singly or in pairs, from each cell (fig. 15a, which represents the beginning of the polypide of Lepora cidilus), and from various parts of the cell, on the back or sides, near the top or not far from the bottom. And it is to the variety of modes in which the cells arise that the diversity of form of the polypide is due. In one division of the third sub-order, the Cheldestomata, the cells do not arise from another, but from a tube common to several cells, and which is either divided or not into distinct intermedes. This portion of the polypide is termed the Basal Tube.

Having thus defined most of the terms which it is necessary to employ for the purposes of classification, we will briefly describe the anatomy of the various parts of the animal in the order in which it is given by Professor Allman.

Organs for the Preservation of the Individual.

A. Dermal System.

The Polypide is formed of a number of little chambers, or cells, organically united, each of which contains a polypide, and is limited by two walls, a firm, tough, membranaceous, and contractile (the Endocyst), and an external investment (the Ectocyst). The endocyst lines the interior of the cells and when it arrives at its orifice would protrude beyond the ectocyst, were it not that here it becomes invaginated, or inverted into itself, and then terminates by becoming attached round the base of the tentacular crown; during the exfoliation of the polypide it undergoes eversion, sometimes complete, sometimes incomplete. The former constitutes a sort of hollow chamber, in which the polypide is suspended, surrounded by the perigastic space. These sacs are all closed above where they are attached to the polypide, and below, in some cases, their cavities are in communication with those of the neighbouring sacs (or with the lophophore). In such cases, it is clear, that order exists.

The endocyst and ectocyst represent respectively the external and middle tubicula of the Tusciato, or the mantle and shell of other Moluscas.

The endocyst is in all cases thin and membranaceous, and therefore containing only muscular fibres. A portion, perhaps the whole, of the inner surface is clothed with vibratile cilia.

The endocyst varies greatly in composition and aspect. Throughout the greater number of the Polyzoa it is hardened by the deposition of calcareous matter, whilst in many others it is horny and flexible, and in some even of an almost gelatinous consistence. In the P. Hippocrepia it is in most species composed of a tough perigastematic brown membrane, strengthened by the deposition of irregularly formed calcareous matter, sometimes rendering it quite opaque. In other cases again, as in the genus Argulina v. Ben., the soft and flexible, and as it were floculent ectocyst, is pervaded by aluminous and siliceous particles, and the same is the case, as a more extended examination of the Chelostomata, as in Oritractia, Peliceilla the ectocyst would, at first sight, seem to be entirely absent, and the cell to be composed exclusively of the endocyst. Careful examination however shows that both are present, and that the ectocyst, or more accurately, the lophophore, not being free from any earthy deposit. In some instances, and very distinctly in the Selonariadae, or Lunalites, the surface of the calcareous ectocyst is further covered with a thin horn cuticle, apparently resembling that on the shells of many Moluscas.

B. Organs of Digestion.

These consist of an alimentary canal, commencing at the mouth and terminating at the anus; and are subdivided into several portions, which have received the same names as those of the apparently corresponding parts of the alimentary tract in the higher animals. The mouth is edentulous and usually unarmed, though sometimes (as in the proper P. Hippocrepia) furnished with a valve-like organ of very peculiar formation, and which is considered by Professor Allman to be analogous with the 'tongue' of the Ascidians.

From the mouth an oesophagus, or pharynx, leads downwards into the stomach, which in some cases is confined into a sort of gizzard, which in that genus is armed on each side with a serrated tooth. The stomach is a thick walled sac, in most cases dilates inferiorly into a rounded cul-de-sac, or pyloric cavity, from which the intestine springs. The intestines are usually distinguished from the stomach by prominent lips, which project into the intestine. The intestine, wide at the origin, rapidly diminishes in diameter till it terminates at a distinct anus near the mouth. The liver is represented by spherical corporcles of a brown colour, seated on the wall of the stomach. The mouth and upper part of the oesophagus and the commencement of the intestines, are, in most cases, at any rate, furnished with vibratile cilia.

C. Organs of Respiration and Circulation.

Upon the tentacular crown and the walls of the perigastic space, which corresponds with the 'sinus system' of the Tunicata, would seem chiefly to devolve the function of bringing under the influence of the arterial medium the nutritive fluid of the tissues.

The tentacular crown of a Polyzoan consists of two portions; 1. a sort of siage, or disc, which surrounds the mouth and terminal view; and 2. trees, which are borne in an uninterrupted series round the margin of the lophophore. The lophophore throughout almost the entire class is orbicular or annular; but in the Hippocrepia its posterior margin, or that which corresponds to the rectum, is conical, and in the other species so shrunken that that order it exhibits the form of a deep cresent. This condition of the lophophore is found in no marine species, and in Pedicellina, a fresh-water form, the arms of the
a wide of their and probably the would bat if an POL destitute is observed. filaments and Allman been demonstrated, in a series a regular, and vibrating towards the extremity of the tentacle upon one side and towards the base by means of a very irregular form and size. This fluid obviously represents the blood or common nutrient and respiratory fluid of other Molluscs. It is kept in motion by the cilia with the downwards along the membrane connecting the bases of the tentacles of the P. hippocrepia.

The perisarcic space and the interior of the lophophore and tentacles all freely communicate with one another, and are surrounded by the base of a mass of a very irregular form and size. These fluidic masses resemble the blood or common nutrient and respiratory fluid of other Molluscs. It is kept in motion by the cilia with the downwards along the membrane connecting the bases of the tentacles of the P. hippocrepia.

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D. Organs of Motion

The muscular system in the Polypoecos is highly developed, and the muscles are arranged so as to exhibit interest in a physiological point of view, for they seem to present an example of true muscular tissie reduced to its simplest and essential form. They are composed of bundles of elementary fibres, each being in length, and which are distinctly marked with transverse strie. They resemble in fact very closely the fibres of the thoracic muscles of insects. In the marine Polypoecos however another kind of fibres may be noticed, presenting nodular enlargements, which would seem to resemble very closely the isolated, organic muscular fibres of the higher animals. The muscles are disposed in distinct sets, and it is by the agency of these various sets that the movements of propulsion and retraction of the polypide are affected, together with the actions of the tentacles and of the avicularia and vibracula. For the arrangement of the muscles in the former class of organs see fig. 2 (6), in the article MOLLUSCA, p. 2. The curious analogies in the disposition of these muscles in the Polypoecos with that of each other, the lined but there is no special circulatory organ as in the Annelid.

E. Organs of Sensation

A distinct nervous system was first shown to exist in the Polypoecos by M. Dumortier in Lophopus crystallinus, and has been demonstrated by Van Beneden in Lamignula, and by Allman in all the Hippocrepian genera except Paludiceula; it may be deemed therefore to exist generally in the class, and that the forms which are devoid of it, are exceptions. It is possible that the species of the Hippocrepian order may there be seen, attached to the external surface of the osophagus, on its rectal aspect, just below the mouth, a hollow oval body of a yellowish colour, which is undoubtedly a nervous ganglion, as Professor Allman has succeeded in distinctly observing nervous filaments in connection with it; some of which may be traced going to each tentacle. The ganglion also sends off filaments upwards towards the mouth, and one may be induced to think that the lining of the tentacle is composed of nothing like a complete collar surrounding the tube has been observed.

The Polypoecos do not seem to possess any special organs of sense.

F. Organs of Locomotion

In Cristatella, the ectocyst, according to Professor Allman, in highly contrac tile, and presents, below, a flattened disc, destitute of apertures. Upon this disc, which closely resembles the foot of a Gasteropod, the singular polymeric cymes about upon the stems and leaves of aquatic plants. Except in the embryonic condition no other Polypoecos would seem to possess any power of locomotion; or at any rate none has been noticed, but several reasons would seem to render it improbable that the ones belonging to the Solenostome may be capable of locomotion by means of their curiously constructed vibracula.

G. Reproduction

In the Polypoecos, observes Professor Allman, three distinct modes of reproduction may be taken into account; namely, by eggs or germ; by true ova; and by free locomotive embryos.

1. Reproduction by Eggs.—The eggs always originate in the endocyst, first appearing as small tubercles projecting into the perisarcic space, but which may soon be seen to be enveloped in a membranous covering. If the bud now presents the appearance of a vesicle projecting from the exterior of the parent-cell, closed at its external or free extremity, but having its cavity in communication with the perisarcic space. The position is gradually developed in the interior of the egg by the differentiation of its fine granular contents, and the extremity of the bud ultimately opens so as to admit of the excretion and retraction of the young animal. Thus is produced a fresh cell of the polyzoal form, as a free zygote, whose exit depends upon the point of the cell at which the bud springs. This differs in almost every species, and upon this difference depends the diverse physiognomy of the various species. For instance, if each cell pullulates at a single point at the upper or lower extremity of the vesicle, and should be presented; if from each cell two are given off and remain in close apposition, a circularly expanded disc of greater or less regularity is developed, the extremity of this disc depends upon the point of the cell at which the bud springs. In the Polypoecos, Professor Allman says, that the ovary and testicles are both found in the same cell. The former is an irregularly shaped body, adherent to the inner surface of the endocyst, towards the upper part of the cell. The testicle is an irregularly lobed mass attached, like the ovary, to the inner surface of the endocyst. It occupies a position near the bottom of the cell, and is thus separated by a wide interval from the ovary. The ovary is at the side of the stomach by a cylindrical cord. The form of the ovary in the proper Hippocrepia would appear more to resemble a moniliform cord. In Laguncula (Farrella), according to Van Beneden, the ovary and testicles, in form and situation, would seem very closely to resemble those in Polypoecos (figs. 15 and 16). some Membranopora, &c., and so on.

2. Reproduction by Ova.—All the fresh-water, and probably, also, all the marine Polypoecos, produce true ova, which are formed in a definite organ or ovary; and from the case of the ova differing in different species, we are led to expect the co-existence of a male organ. That a testis is present in all the species of fresh-water Polypoecos, at any rate, no doubt, according to Professor Allman, can be entertained, and in Laguncula (Farrella) is in the existence of the ovary. This organ is described and figured by Van Beneden. In Paludiceula Professor Allman says, that the ovary and testicles are both found in the same cell. The former is an irregularly shaped body, adherent to the inner surface of the endocyst, towards the upper part of the cell. The testicle is an irregularly lobed mass attached, like the ovary, to the inner surface of the endocyst. It occupies a position near the bottom of the cell, and is thus separated by a wide interval from the ovary. The ovary is at the side of the stomach by a cylindrical cord. The form of the ovary in the proper Hippocrepia would appear more to resemble a moniliform cord. In Laguncula (Farrella), according to Van Beneden, the ovary and testicles, in form and situation, would seem very closely to resemble those in Paludiceula. It would appear also that the impregnation of the ova is effected by their escaping from the ovary into the perisarcic cavity, where they are brought into contact with the spermatzoa, which have in like manner escaped from the testicle into the same cavity, and are swimming actively about in vast numbers in the fluid with which it is occupied. There does not appear to be any special opening for the escape of the ova after impregnation, which is probably effected by the fluid from the endocyst. The forms of the ova vary a good deal in different genera, and in some cases they are ciliated.

3. Professor Allman also describes a mode of reproduction by free embryos, but does not seem to have noticed their mode or plan of development, consisting of coelomal development. The embryo upon its escape from the ovum appears sometimes to be ciliated, sometimes not. In the case of Lepralia coccineus, a chellostomatous species, the appearance of an embryo of the Polypoecos of recent development are well described by Mr. Ooss (Naturalist's Rambles on the Devonshire Coast, p. 218). But although the above brief description of the reproduction of the Polypoecos by ova formed and impregnated within the perisarcic space, and afterwards extruded, is undoubtedly correct, it is only to the species in which it has actually been observed, but from analogy to others as well, it cannot be denied that very considerable obscurity rests upon the mode in which the ova are developed in the ovicells or receptacles, which have
received that name, and as to the relation which those organs bear to the rest of the animal. There can be no doubt that these organs contain an ovum or ova, and that these ova are developed from, in them, and there undergo segmentation; but how these ova are fertilised, and why a difference so great as this in the position of the ovivorous organ should exist in apparently closely allied genera or even species, is at present inscrutable.

Section III. Classification.

The more general relations of the Polyzoa having, as before observed, been described under the head of Motisia, the remainder of this article will be devoted to the mode in which they may be conveniently arranged among themselves.

With our present defective knowledge of many particulars respecting the conformation of the Polyzoidea, the classification of the Polyzoa can only be attempted with any prospect of useful results, from the study of the Polyzoa; that is to say, so far as regards the determination of the subordinate groups—the orders themselves being defined by characters derived from the Polyzoidea, or soft portion of the animal. The following scheme, which in its main features has been long received, appears to offer as convenient, and so far as our present acquaintance with the subject allows, perhaps as natural a classification as can be expected.

Class Polyzoa.

Social molluscan animals, whose nervous system consists of a single post-esophageal ganglion, with branches, but without a nervous ring around the esophagus; and without any special organs of sense or of circulation. Mouth surrounded more or less completely with a single row of ciliated tentacles.


Bryozoa, Ehrenb., 'Corallien-Thiere des Roth. Meere,' 1831 (1834 i).

Mollusca Zoophyta, see Zoophyta Ascidioidea, Johnston, 'Mag. Zool. and Bot.', 1836.

Ciliobrachia, Farre, 'Phil. Trans.,' 1837.

Order I. Polyzoa incommunulata, Gervais.

Tentacles disposed on an uninterrupted annular lophophore, surrounding the unarmed mouth.

Sub-Order I. Chelomastata.

The crescentic subterminal mouth of the cell is furnished with a moveable lip, by which it is closed when the animal retreats.

Escharidae, Plumatidae, Cellariidae (ex. Orissa), Fleming. Polyopariara operculifera et cecumopicus (ex. Orissa), Blainville.

Escharana, Cellagoria, Ehrenberg.

Urococellata (pars), Hapagow.

A. Cells disposed in a single series.

Family 1. Catenicellidae, Bok.

Cells connected by short flexible tubes.

Gen. 1. Catenicella, Blainv. (Figs. 1, 2.)

Cells connected by short corneous tubes, all facing the same way; polyzoan pharynx, erect, dichotomously branched; cell at the bifurcation geminated.

a. Peristrepta. Cells fenestrated in front; ovicella terminal. beta. Vittata. Cells with a narrow elongated band or vittae on each side in front; ovicella galleriform, not terminal.

Catenicella, Blainville; 'Brit. Mus. Cat.,' p. 3.

Catenaria, Savy, 'Egypt,' pl. 13.

About seventeen species known; mostly Australian.

Gen. 2. Alysium, Bok.


Three species known.

Gen. 3. Calpodium, Bok. (Fig. 3.)

Cells with an avicularium on each side; each cell with three distinct apertures, arising one from the upper part of another in a linear series, connected by short corneous tubes.
B. Cells disposed in a double or in multiple series.

Family 3. *Salicornariadae.*
Cells disposed around an imaginary axis, forming cylindrical branches of a dichotomously divided erect polyzoary.
- *Salicornaria* Gray.
*Salicornaria* (pars), Brit. Mus. Cat., p. 15.

Gen. 1. *Salicornaria,* Cuvier. (Fig. 4.)

Front of each cell much depressed, surrounded by an elevated ridge, by which the surface of the branch is divided into more or less regular, rhomboidal or hexagonal spaces; avicularia scattered; oviscells immersed, inconspicuous; branches articulated.

*Salicornaria,* Cuvier; Johnston; 'Brit. Mus. Cat.', p. 15.

*Paracellaria* (pars), Gray; Johnston, 'Ed.' i.

*Cellaria* (pars), Lamark; *Linn.: De Blainville.*

Five species.

Gen. 2. *Nellia,* Busk.

*Front of cell convex, with a distinct raised border; aperture very large; oviscells (?) no avicularia.

*Salicornaria* (pars), Busk; 'Voyage of Rattlesnake,' i. 367.


Two species.

Gen. 3. *Vincularia,* De Blainv. (Fig. 19.)

Polyzoary rigid, calcareous, inarticulated; surface not areolate; aperture large; no avicularia; oviscells inconspicuous.


*Glacolumna,* Goldfuss.

*Stiphanella,* Hagenow.

*Cellaria,* (pars), Reuss.

One recent species; numerous fossils.

Gen. 4. *Pareiminaria,* Busk. (Fig. 5.)

Polyzoary cornose, flexible; margin of aperture much raised; aperture very large; oviscells encuillate, prominent; no avicularia.

*Pareiminaria,* Brit. Mus. Cat., p. 32.

One species.

Cells disposed in the same plane, forming linear branches of a dichotomously divided phytoid, erect, articulated polyzoary.

*Bugulida* (pars), Gray.

*Cellulariada* (pars), Johnston.

*Escharida* (pars), Johnston; Gray.


Gen. 1. *Cellularia,* Pallas. (Fig. 5.)

Cells bi-triarial; more than four in each internode; oblong or rhomboidal, contiguous; perforated behind, unarmed, or very rarely with an avicularium on the upper and outer angle of the cells.

*Cellularia* (pars), Pallas; Fleming; Johnston (pars);


*Bugula* (pars), Gray; Oken.

Three species.

Gen. 2. *Menipea,* Lamouroux.

Cells oblong, or elongated and attenuated downwards; imperforate behind, with a sessile avicularium (frequently absent) on the upper and outer angle, and one or more sessile avicularia on the front of the cell below the aperture (not always present).


*Cellaria* (pars), Linn.; Solander.

*Cuvia* (pars), Lamouroux.

*Triellaria,* Fleming; Blainville.

Six species.


Cells rhomboidal, with a sinus on the outer and hinder aspect; each furnished with a sessile avicularium at the upper and outer angles, and with a vibraculum behind. Cells basiolar and numerous in each internode.

*Scrupocellaria,* Van Beneden; Gray; 'Brit. Mus. Cat.,' p. 23.

*Biedellaria* (pars), Blainville.

*Cellularia* (pars), Pallas; Johnston.

*Cellaria* (pars), Solander; Lamark.

*Scrupusulata* (pars), Oken.

Seven species.

Gen. 4. *Canda,* Lamouroux.

Cells rhomboidal, situated on the outer side for the lodgment of a vibraculum; no avicularium on the upper and outer angles; sometimes one in front of the cell.


*Caudara* (pars), Lamark.

*Cellaria* (pars), Van Beneden.

*Biedellaria* (pars), Blainville.

*Scrupocellaria,* Gray.

*Celliculata* (pars), Johnston.

Two species.

Gen. 5. *Emma,* Gray.

Cells in pairs or triplets; a sessile avicularium (sometimes wanting) on the outer side below the level of the aperture.

*Emma,* Gray; 'Brit. Mus. Cat.,' p. 27.

Two species.

Family 5. *Cabereuda,* Busk.

Polyzoary dichotomously divided into ligulate bi-multiserial branches; on the backs of which are vibracula, each of which is common to several cells.
Cells bi-multiserial, in the latter case quincuncial. Back of branches covered with large vibracula, which are placed obliquely in two rows, diverging in an upward direction from the middle line, at which the vibracula of either side do not meet with those of the other.


(Fig. 10.)

Gen. 2. Anomastis, Busk.

Cells bi-quadrisserial; vibracula small, resembling avicularia.

One species.  


No vibracula; avicularia, when present, pedunculate.

Bicellariidae, Busk; 'Voyage of Rattlesnake.'

Bicellaria, Gray.

Gen. 2. Halophila, Gray.

Cells contiguous, attenuated downwards; much expanded above, with a large plain aperture unarmed.

Halophila Gray; 'Dief. New Zealand; 'Brit. Mus. Cat.', p. 43.

Bicellaria, Busk; 'Voyage of Rattlesnake.'

Gen. 3. Bugula, Oken.

Cells elliptical (behind), closely contiguous, bi-multiserial; aperture very large; margin simple, not thickened.

Bugula, Oken; Gray; 'Brit. Mus. Cat.', p. 43.

Acaamarchia, Lamx.; Blainville.

Crista (ep.), Lamx.

Cellaria (ep.), Lamarck.

Cellularia (sp.), Fleming; Johnston.

Four species.

Gen. 2. Gemellaria, Savigny.  
(Fig. 29.)

Cells opposite in pairs. Polysanary continuous.

Gemellaria, Savigny; Van Beneden; Johnston; Gray; 'Brit. Mus. Cat.', p. 34.

Gemicellularia, Blainville.

Loricaria, Lamx.

Notamia (pars), Fleming.

Loricula, Cuvier.

Crista (sp.), Lamx.; Lamarck.

Serpoptera (L), Oken.

One species.


Cells joined side to side; no avicularia.

Didymia, Busk; 'Voyage of Rattlesnake; 'Brit. Mus. Cat.', p. 35.

One species.

Gen. 3. Dimotopia, Busk.  
(Fig. 9.)

Cells joined back to back; aperture oblique; each alternate pair of cells looking the same way.

Dimotopia, Busk; 'Voyage of Rattlesnake.'

Two species.


A pair of tobacco-pipe shaped avicularia, visible above each pair of cells.

Epistoma (sp.), Fleming; Gray.

Dynamena (sp.), Lamx.; Blainville.


Gemicellularia (ep.), Blainville.
Sertularia (sp.), Gmelin.
Cellularia (sp.), Pallas.
One species.

Family 8. Fluistradae, Gray.
Polyzoa flexible, expanded, foliaceous, erect; sometimes decumbent and loosely attached. Cells multiseriate, quinquecunial, or irregular.

Fluistrada, Linn.; Johnston (pars).
Fluistradae, Gray (pars); 'Brit. Mus. Cat.', p. 48.
Escharidae (pars), Johnston; Gray.
Polyplacata (pars), Lamarck.

Gen. 1. Fluistrada, Linnæus.
Cells contiguous; on both sides of the frond.

Gen. 2. Carbaseae, Gray. (Fig. 12.)
Cells contiguous; on one side only of the frond.
Carbaseae, Gray; 'Brit. Mus. Cat.', p. 60.
Ten species.

Gen. 3. Diachoria, Busk. (Fig. 13.)
Cells disjunct; each connected with six others by tabular processes.

Diachoria, Busk; 'Voyage of Rattlesnake.'
Three species.

16a. Young state of Lepralia ciliata.

Family 9. Membraniporidae, Busk.
Polyzoa membranaceo-calcareous, or calcareae, expanded, encrusting (sometimes foliaceous, contorted, and sub-erect). Cells horizontal, quinqueunial, or serial.

Membranipora, Gray; p. 48.

Polyzoa encrusting (or suberect, foliaceous, and contorted), spreading irregularly. Cells more or less irregularly disposed or quinquecunial, with raised margins; a greater or less extent of the aperture occupied by a thin membrane.

Gen. 1. Membranipora, Johnston. (Fig. 14.)

Polyzoa encrusting (or suberect, foliaceous, and contorted), spreading irregularly. Cells more or less irregularly disposed or quinquecunial, with raised margins; a greater or less extent of the aperture occupied by a thin membrane.

Eschara (pars), Pallas.
Fluistrada (sp.), Linn.; Esper; Berkeley; Lamarck; Grant; Fleming; Risso; Johnston; Lamaroux.

Annulipora, Conopeum, Callopora, Amphiabatium, Micropora, Gray.

Eighteen species.

** Aperture of cells entirely filled in by a convex calcareae expansion. Cells disposed in more or less regularly radiating lines.

Gen. 2. Lepralia, Johnston. (Figs. 15 & 15a.)


Polyzoa encrusting, craspeaceae, spreading from a centre in a more or less circular form; composed of contiguous, or connected, calcareae, decumbent cells, the wall of which is complete in front.

Lepalia (sp.), Moll.; Pallas.
Lepalia, Johnston; Gray; 'Brit. Mus. Cat.', p. 63.
Berenicea, Fleming (non Lamaroux nor Peron).
Escharina (sp.), Milne-Edwards; Gray.
Escharidae (sp.), Milne-Edwards.
Cellepora (sp.), Oken; Audouin (pars); Lamaroux (pars); Hagenow (pars).
Fluistrada (varior).
Discopora, Lamarck (pars); Gray (pars); Lamaroux (pars).

Orbillo, Herencia, Escharilla, Porela, Celleporella (all sps.), Gray.

1. Armatae. Species provided with either avicularia or vibracula.

A. Species having avicularia.

a. Median and single.

* Superior (above the mouth).

** Inferior (below the mouth).

b. Avicularia double, or azygous and lateral on each cell, or only on some cells in the polyzoa.

B. Species having vibracula.

2. Inarmatae. Species without either avicularia or vibracula.

a. With oral spines.

b. Mouth unarmed.

About fifty or sixty species.

Family 10. Celleporeida, Busk.
Polyzoa or acoenous, composed of cells, standing more or less

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vertical to its axis or plane, heaped together, or irregularly overlapping each other.

**Celleporidae**, Johnston (pars); 'Brit. Mus. Cat.', p. 89.

Gen. 1. *Cellepora*, O. Fabricius. (Fig. 16.)

*Cellepora* calcareous, rigid, adnate or erect, composed of urceolate, suberect, contiguous cells, heaped together irregularly, or arranged quincuncially. An ascending rostrum on one or both sides of the month usually furnished with an avicularium.

*Cellepora* (sp.), O. Fabricius; Johnston; Linnæus; Müller; Berkeley; Stewart; Lamark; Lamouroux; Fleming; Olivi.

**Echihara** (pars.), Oken.

**Millepora** (pars.), Linn.

**Millepora** (pars.), Pallas; Ellis and Solander (pars).

**Eschara** (pars.), Pallas.

* Adnate, globose, or spreading.
** Erect.

Eight species.


Polyzoa erect, rigid, foliose and expanded, lobate or reticulate. Cells disposed quincuncially in the same plane, on one or both surfaces.

**Escheridae** (pars.), Johnston.

*Lepralianus* (pars.), Gray.

**Retepora**, Gray.

Gen. 1. *Eschara*, Ray. (Fig. 17.)

Polyzoa foliose and expanded, or contorted, or branched and sublinear. Cells disposed on both surfaces, back to back, immersed, coalescent, horizontal to the plane of the axis.

**Eschara**, Ray; Fleming; Johnston; Lamark; Gray; Pallas (pars); Moll (pars); 'Brit. Mus. Cat.', p. 89.

**Nullipora** (pars.), Solander.

**Cellepora** (sp.), Esper.

* Polyzoa more or less expanded, foliose.
** Polyzoa subdivided into branching lobes.

Eleven species.

Gen. 2. *Retepora*, Imperato. (Fig. 29.)

Polyzoa foliose, calcareous, reticulated. Cells immersed, opening at one surface only.

**Millepora**, Linn. (pars); Ellis and Solander; Esper; Marsigli; Cuvier.

**Retepora**, Imperato; Lamark; Risso; Fleming; Stark; De Blainville; Couch; Johnston; Goldfuss (pars); Hagenow (pars); 'Brit. Mus. Cat.', p. 93.

**Frenchiopora**, Oken; De Blainville.

Three species.

**Fig. 18; vide also fig. in Cellebrma.**

Each cell throughout the polyzoa with a vibraculum at the summit.

*Cupularia*, Lamouroux (proposed); 'Brit. Mus. Cat.', p. 97.

**Lamellites**, Lamouroux (pars); Defrance (pars); Des- longchamps (pars); Goldfuss (pars); De Blainville (pars); Gray; Cuvier and Brongniart; Lonsdale (pars); Michelin (pars).

**Frenchiopora**, Lonsdale.

Five species (recent); numerous fossil.


Cells arranged in series radiating from the centre and bifurcating as they advance; vibracula in linear series alternate with those of the cells.

As in the preceding species.

Four species (recent); numerous fossil.


Polyzoa more or less regularly orbicular, convex on one side, plane or concave on the other (probably free). Furnished with large and powerful vibracula, with variously formed sets (probably locomotive).


Polyzoa more or less regularly orbicular, convex on one side, plane or concave on the other (probably free). Furnished with large and powerful vibracula, with variously


Polyzoa more or less regularly orbicular, convex on one side, plane or concave on the other (probably free). Furnished with large and powerful vibracula, with variously formed sets (probably locomotive).


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Polyzoa more or less regularly orbicular, convex on one side, plane or concave on the other (probably free). Furnished with large and powerful vibracula, with variously formed sets (probably locomotive).

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Sub-Order II. Cyclostomatata.

Cells tubular, calcareous, immersed or exerted; mouth terminal, without any moveable appendage or lip.

Tubulipora, Milne-Edwards.
Tubuliporides, Johnston.
Auloporina (pars), Ehrenberg; Johnston.

A. Erecta.
Polyzoary erect, free, simple or branched, linear or expanded above; branches articulated or continuous.

Polyzoarium divided into distinct internodes, connected by a horny substance.

Sertularia (pars), Linn.; Berkeley (pars); Esper (pars); Cellularia (pars), Pallas; Hogg.
Cellaria, Ellis and Solander (pars); Lamarck (pars).
Sertularia, Lamouroux (pars); Risco (pars); Fleming (pars); Templeton.
Uncularia (pars), Blainville.
Crinidea, Milne-Edwards.
Crista (pars), Johnston; Hassall (pars), &c.
One or two species.

Gen. 2. Critia, Lamouroux.
Two or more cells in each internode.
Syn. as above.
Three species recent; several fossil.

B. Adnata, a. decumbentes.
Polyzoarium adnate or suberect above, decumbent and adnate below.

Family 3. Tubuliporacea.
Polyzoarium divided into linear or sublinear branches or lobes, sometimes more expanded and lobate upwards, always decumbent, and closely adnate.

Gen. 1. Alato, Lamouroux.
Polyzoarium composed of a single or of multiple series of cells.
Alato, Lamouroux; Milne-Edwards; Johnston (pars); De Blainville; Fleming.
Millepora (esp.), Linn.
Auloporina (esp.), Goldfuss, &c.
Three or four species recent; several fossil.

Gen. 2. Tubulipora.
Polyzoarium arising from a contracted base, and expanding above; either simple or irregularly subdivided; decumbent and adnate below, usually free and suberect above.
Tubulipora, Milne-Edwards (pars); Johnston (pars); Fabricius; Torton; Gmelin; Ogewh (pars); Fleming (pars); Lamarck (esp.); Risco (esp.).
Tubulipora (esp.), Linn.; Jamieson; Stawert; Bosc.
Millepora (esp.), Ellis and Solander.
Collepora (esp.), Esper.
Florina (.), Lamouroux, &c.
Five or six species recent; several fossil.

Family 4. Discoporacea.
Polyzoarium in the form of a closely adnate, circular, or irregular disc or patch.
Tubuliporica (pars), Milne-Edwards, &c.

Gen. 1. Discopora, Lamarck.
Polyzoarium a circular disc, either flat, concave, or convex in the centre, with the suberect tubes opening irregularly in all parts of the surface, and usually surrounded by a thin calcareous border.
Discopora, Lamarck; Lamouroux; Fleming.
Tubulipora (pars), Johnston.
Millepora (pars), Lamarck.
Millepora, Quoy and Gaimard.
Madrepore, Ellis and Solander; O. Fabricius.

Gen. 2. Diastopora, Lamouroux.
Polyzoarium more or less depressed, circular, discoid; the cells subalternating, horizontal, immersed; openings elliptical.
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**Millepora** (sp.), Esper.
**Meehleriopora**, De Blainville.
**Diatopora**, Milne-Edwards (pars); Johnston (sp.);
Hagenow (pars).
**Aulopora** (sp.), Goldfuss.
**Boreaspora** (sp.), Lamonronx.

**Rosea**, Hémon.

**Avlopora** (sp.), De Blainville.
**Avlopora** (sp.), Lamouroux.
**Sub-Order**, Romer.

**Auto.**
**Gen.**
3. **Dtfrancia**, Bronn.

Polyzoary either discoid and adnate throughout, or fungiform and attached by a short stem; openings of tubes disposed in lines or rows radiating from the centre.

**Pedalia**, Lamouroux.
**Lichenopora**, Michelin.
**Tubulipora**, Milne-Edwards (sp.); Johnston (sp.).
**Ceripora** (anct., pars).
**Debrincia**, Bronn; Hagenow; Reuss.

**Sub-Order III. Icbonostomata.**

**Cells** corneous, or fleshly, tubular or depressed, free or coalescent; mouth terminal or sub-terminal, contractile, and when the polypide is exerted, surrounded with a fringe or row of sets, connected by a delicate membrane.

**Vesicularina**, Johnston.
**Polyzoa** cornea, Gray, and including—
**Polyzoa** cornea, Gray.
**Alcyoniadum** and **Alcyonidae**, Johnston.


**Cells** tubular or ovate, separate, arising from a basal tube common to all or to several; mouth terminal.

**Vesiculariadea**, Johnston.


(Fig. 25.)

**Cells** universal or biserial, and unilaterral, placed in close sets at stated intervals; basal tube divided into internodes.

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**Seriolaria**, Lamark; Riio; Fleming; Templeton; Couch; De Blainville.
**Amathia**, Lamouroux, &c.

Three or four species.


**Cells** ovate or subtubular, disjunct, universal, and unilaterial; polypide with a gizzard.
**Vesiolaria**, Thompson; Farre; Johnston; Van Beneden; Couch.

One species.

**Gen. 3. Valeria**, Fleming.

**Cells** ovate, clustered in whorls at the joints of the basal tube; polypides without a gizzard.
**Valeria**, Johnston; Fleming; Farre; Van Beneden.
**Vasiolaria** (sp.), Thompson.
**Gen. 4. Boverbankia,**

**Cells** unilaterial, irregularly placed, sessile; polypide with a gizzard (armed with two teeth).
**Boverbankia**, Farre; Johnston; Van Beneden.

One species.

**Gen. 5. Ferrella.** (Fig. 27.)

**Cells** elliptical, scattered; polypide without a gizzard.
**Ferrella**, Ehrenberg; Johnston.
**Lagenella**, Farre.
**Lagynula**, Van Beneden.

Two species.


**Cells** tubular, supported on a common stalk, and branching out in a palmate fashion.
**Anginella**, Van Beneden.


**Cells** fleshly, immersed, angular; mouth terminal, simple, contractile.
**Holocyonella**, Johnston.
**Polyzoa** cornea, Gray.
**Alcyoniadum**, Johnston.
**Alcyonidae**, Johnston.


**Polyzoary** irregularly lobed, massive, fleshly, erect, or adnate.
**Aleyoniadum**, Ellis; Baxter; Pallus; Linn.; Olivi; Esper; Müller; Lamouroux; De Blainville; &c.
**Aleyoniadum**, Lamouroux; Gray; Hooker; Johnston; W. Thompson; &c.
**Holocyonella**, Farre; Van Beneden.
**Cyrtula** (sp.), Hassall.
**Sarcbochium** (?), Hassall.

Three or four species.

**Sub-Order IV. P. Pedicellinae, Gervais.**

Lophophore produced upwards on the back of the tentacles, uniting them at their base in a sort of muscular calyx.

**Family 1. Pedicellinae**, Johnston.

**Gen. 1. Pedicellinae, Sars.**

Polyzoide not retractile within the delicate closely adnate ectocyst, which is produced downwards into a long tubular pedicle, containing muscular fibres, and rising vertically from a creeping radicle tube.

**Hydra** (sp.), Fleming; Bosc; Lister; Sharp—
**Pedicellinae**, Sars; Johnston; Van Beneden.
**Lesia**, Milne-Edwards; De Blainville; Gervais; Hassall.
**Crominomorpha**, Van Beneden.
Two or three species.
**Sertiolaria** (sp.), Müller; Bosc; Lamark.

Three species.

**Order II. Polyzoa hippocrepia, Gervais.**

**Cells** disposed on a crescentic or horse-shoe shaped lophophore; eversion of endocyst only partial.
**Polyzoaria hippocrepia**, Gervais.
**Polyzoa hippocrepia**, Gray.
**Lemniadea**, Johnston; Allman.
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Freshwater Polyoca, Allman.
Freshwater Bryooca, Hancock.
Bryozoaires Fluvialistes, Van Beneden.

Family 1. Cristatellidae, Allman.
Polyzoary free, locomotive.

Polyzoary saciform, hyaline, with a common flattened disc adapted for locomotion; orifices placed on the surface opposite to the disc, and arranged in several concentric marginal series; ova lenticular, with annular and marginal spines.

One species.

Family 2. Alcyonidae, Allman.
Polyzoary rooted.

A. Lophophore with two long arms.

Gen. 1. Lophopus, Dumboriot.
Polyzoary saciform, hyaline, with a disc which serves for attachment, but not for locomotion; orifices scattered; ectocyst gelatinous.
Polyta to Panache, Trembley.
Bell-Flower-Animal, Baker.
Nahe, Lamouroux; Deslongchamps.
Plumatella (sp.), Schweigger; De Blainville; Gervais; Lamarck.
Aleyonella, Raspaal; Johnston; Allman.
Lophopus, Van Beneden; Allman.

One species.

Gen. 2. Aleyonella, Lamarck.
Polyzoary tubular; tubes united by their sides; orifices terminal; ectocyst pergamnaceous.

Tubularia, Pallas.
Leucopha, Muller.
Aleyonum, Bruguiere.
Spongia, Schmiedel.
Aleyonella, Raspaal; Pallas (sp.); Allman, &c.
Plumatella, Gervais.

Three species.

Gen. 3. Plumatella, Lamarck. (Fig. 30.)
Polyzoary tubular; tubes distinct; ectocyst pergamnaceous.

Tubipora, Lamarck.
Tubularia, Muller; Lionnes; Vacher; Turton.
Nahe, Lamouroux; Deslongchamps.
Plumatella, De Blainville; Carus; Lamarck; Dumortier; Johnston; Gervais; Allman; Thompson; Van Beneden; Dalzeli; Schweigger; Risso, &c.

Ten species.

PLumatella cristata.

B. Lophophore with the arms obsolete.

Gen. 4. Fredericella, Gervais.

Polyzoary confervoid, composed of a membrano-corneons branched tube, with the branches distinct and terminated by the orifices, circular, with a smooth margin and tectal crown or annulus; ova bean-shaped, distal of annulus or spines.

Tubularia, Blumenbach; Gmelin.
Nahe, Lamouroux.
Diplopodia, M. Deslongchamps.
Plumatella, Fleming; Dumortier; Johnston.
Fredericella, Gervais; Van Beneden; Thompson; Allman; Johnston; Hancock.

Family 3. Paludicellidae.
Lophophore orbicular, mouth distal of valve. (Does not perhaps properly belong to P. hippocrepia.)

Gen. 1. Paludicella, Gervais.
Polyzoary membrano-corneons, branched; branches composed of a series of claviform cells, placed end to end, and separated from one another by complete septa; orifices tubular, lateral, placed near the former extremity of each cell; ova lenticular, with a narrow annulus.

Aleyonella (sp.), Ehrenberg; Nordmann.
Paludicella, Gervais; Van Beneden; Allman; Thompson; Johnston; Hancock.

POLYPODICTIGM, a genus of Plants belonging to the natural order of Filiata, the sub-order Polyphaceae, and the tribe Aspicaceae. The infusion is circular, attached by the centre; the veins are distinct after leaving the midrib. There are three British species:—
P. Lomites, with rigid simply pinnate fronds. Found in Alpine rocks.
P. aculeatum, with linear rigid bipinnate fronds; the pinnales obliquely decurrent. Common in hedge banks.
P. angustata, with the fronds lax, drooping, bipinnate, pinnales truncate below, distinctly stalked. Found in the west of England, on sheltered banks.

(Babington, Manual of British Botany; Lindley and Moore, The Ferns of Great Britain and Ireland, nature-printed.)

POMPHILIDE, a family of Fossilary Hymenopterous Insects. They are sometimes included with the Sphignidae. They have the collar either transversely or longitudinally square, with the abdomen more or less oval, and attached to the thorax by a very short peduncle. The legs are very long. The fore wings have two or three perfect submarginal cells, and another commenced at the tip of the wings. The species are called Sand Wasps, and are amongst the most ferocious of the insect tribes. The species of the exotic genus Pegan are amongst the largest of the Hymenoptera. The genus Ponomia is British. The species are very active, running amongst grass and other plants in hot sandy situations. They are quick in their motions, and their wings are constantly agitated. Their long legs give them the appearance of spiders. (Westwood, Families of Insects.)

PONERA (Latreille), a genus of Insects belonging to the family Formicidae. In this genus the neuters and females are armed with a sting. The pedicle of the abdomen is formed of a single nod; antennae in these individuals thickened at the tip; mandibles triangular; head sub-triangular. P. contracta is a small species, a native of England.

POOL, or WELSHPOOL. [Montgomeryshire.]
POONAHILITE. [Mineralogy, § 1.]
POOR LAWS. There have been several statutes making slight alterations and amendments in the details of the administration of these laws, but none calling for particular mention, any analysis or enumeration of their provisions being impossible within the compass of this article.

Under the head of PAUPERISM [Penny Cyclopaedia, vol. xvii. pp. 327-30], an account was given of the establishment of the new Poor Law in England in 1834, and of its early operation up to the year 1840. Since that time the number of Unions has been increased from 957 to 694, including 14,168 parishes in England and Wales, and leaving only 456 parishes which do not make returns to the General Poor Law Board. The new Poor Law had, on its introduction, effected a large reduction of the expenditure on the poor, but from 1839 a gradual increase took place for several years. In the former article it was shown that there was no connection between the amount of relief required by the poor and the size of their property. As the subsequent returns only confirm the same fact, we shall omit the price of wheat, 3 Y.
and give the total amount levied for poor-rates in each year. The years end uniformly at Lady Day. The second column gives the total amount levied for poor-rates, and the third the amount expended for the maintenance of the poor.

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<th>Years</th>
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</tbody>
</table>

In the years above mentioned we may observe that in 1852 the average price of wheat was 35s. 4d.; in 1840 it was 68s. 6d.; yet the amount of relief shows but a small difference. The number of persons relieved is an imperfect guide to the amount of distress, as it does not distinguish, except as regards in-door relief, between a single meal or assistance for a lengthened period, but we add a few statements of numbers at different periods. In the quarter ending Lady Day 1840, there were 169,228 persons relieved in workhouses only, and the number continued to increase till 1843, when the number in the house was 238,660, and receiving out-door relief 1,300,530. The numbers then slowly decreased till 1847, when the in-door went down to 146,406 and the out-door to 1,456,213, increasing respectively in 1848 to 305,056 and 1,370,585. Until 1848 the quarter ending Lady Day was taken as representing the number of persons relieved in each year. Since then the numbers in receipt of relief on Jan. 1 and July 1, have been taken, being the periods of greatest and least distress. Thus, on Jan. 1, 1849, there were 131,591 persons in the house, and 855,275 receiving out-door relief; on July 1, there were only 102,651 in the house, and 753,885 receiving out-door relief. The estimated total for the two quarters, however, including 214,870 for places granted and included in the returns, was 1,043,886. In 1853 the number similarly calculated had sunk to 857,035. On Jan. 1, 1857, the total number of paupers in receipt of relief, in-door and out-door, in 624 unions and parishes of England and Wales, was 843,340, being a decrease from 1856, in the same number of unions, of 33,255, or 3.8 per cent. Of adult able-bodied paupers relieved, exclusive of vagrants, there were 139,180, a decrease of 10,041, or 6.9 per cent. Of the number relieved in 1856, 12,042 were widows, or in the same class of 2291. Of the gross number of able-bodied paupers, 22,358 were in the receipt of in-door relief, a decrease of 1128 only, so that the chief decrease is in out-door relief. The greatest decrease took place in Bedford, Lancaster, Nottingham, Rutland, and Cirencester, where it exceeded 20 per cent. In Kent, Hereford, Durham, Oxford, Suffolk, and Worcester, there was an increase, as also in several of the Welsh counties. Of the in-door adult able-bodied, there were 842 married men, 1077 married women, 5052 other males, and 14,657 other females. Of the outdoor adult able-bodied, 53 males had been relieved in cases of sudden or urgent necessity; 17,210 males in cases of their own sickness or accident, 8936 males in cases of sickness or accident in their family, or for a funeral: 3784 males for want of work or other causes; 22,330 females were wives of adult males, 50,382 were widows, 5114 were single white women without children, 2690 the mothers of illegitimate children; 2018 were wives relieved on account of the insufficiency of food in their families, and 1298 were wives of soldiers, sailors, and marines; and 4389 were wives of other non-resident males.

The amount expended in the half year ending Lady Day 1857 for the relief of the poor was 1,979,882, of which 493,076£. was for in-door maintenance, and the remainder for out-door relief.

Ireland. In consequence of the distress occasioned by the potato famine the numbers relieved in that country also increased. It was considered necessary to provide a poor-law for Ireland. Accordingly, in 1838, an Act (1 & 2 Vict., cap. 50), mainly founded on the reports and recommendations of Mr. (now Sir George) Nicholls, was passed. In its main features it resembled the English poor-law, but the workhouse as a test of need was more stringently enforced. Mr. Nicholls was appointed chief commissioner, and under his direction it came into operation in 1839. The unions were formed gradually, and the expense of the system continued to increase. For a time this amount were granted for that purpose by government, a considerable portion of which was subsequently remitted. In 1840 there were but four unions in operation, North and South Dublin, Cork and Londonderry, and in these there were in the year 10,910 had been relieved in the year, and the expenditure had been 37,057L. On Dec. 31, 1841, there were 37 unions in operation, and there had been relieved 31,108 destitute persons, and 15,246 were then in the workhouses; the expense was 88,273£. On Dec. 31, 1844, 31,072 persons in 92 union workhouses, 87,904 persons had been relieved, and the expense had been 881,233£. On Dec. 31, 1843, there were 33,510 inmates in 106 workhouses, 19,414 had been relieved, and the expenditure had been 984,374£. On Dec. 31, 1844, there were 39,175 inmates in 113 workhouses, 105,365 persons had been relieved, and the expense had been 299,307L. In 1845 another period of distress occurred through the failure of the potato, and the number of the destitute continued to increase. On Dec. 31, 1845, there were 42,065 inmates in 123 workhouses (in March 1845 there had been 50,717), 114,205 persons had been relieved, and the amount spent 316,092L. In 1846 the potato-rot continued, and the distress increased to an extent unparalleled in the history of Ireland. It was caused by its relief by providing public works to employ the able-bodied, by reducing the duty on the import of corn, and by furnishing food at a low price to the destitute poor, in which it was thought also to have been greatly assisted by the Act of 1843, which was estimated to have amounted to 88,004, the whole sum contributing amounted to 531,372. The greatest number of persons employed at one time on public works was 97,000. On Dec. 31, 1846, in 130 workhouses there were 94,437 inmates, 248,333 persons had been relieved, and the expense had been 420,901L. But the evils arising from the continued failure of the potato continued to operate. Food was scarce, and the public works, instead of alleviating the distress, seemed likely to increase it. Agriculture was abandoned in many districts, the government was unable to prevent this, funds were wasted, and ten thousand left their trades. In October 1846 there were 11,040 men employed; in January 1847 the number had increased to 570,000; and in March to 734,000. It was evident a change of system must be adopted. Experiments were made to apply again the workhouse test, and the number rapidly fell, in April to 520,000, in May to 419,000, in June to 101,000, on the 26th of which month it was reduced to 23,000, and in August the system was discontinued. Cooked food had also been given to the poor in large quantities; 12,984,000 persons had been relieved in the year 1846, and they were given in separate rations. The entire amount advanced by government in 1845 and 1847 had been 7,132,268L., and the amount subscribed had been upwards of half a million. It was in these circumstances that the Act of 1847 was passed.
They found a poor-house of very inadequate accommodation, and the system was almost uniformly one of out-door relief. The report recommended a legislative enactment for a regular system of poor-laws, and accordingly in 1845 the 8 & 9 Vict. c. 53 was passed, by which the management elected by the rate-payers, a board of supervision, gave the power of levying assessments; the option of combining parishes for the erection of poor-houses; made a more certain provision for relief of the lunatic, casual, and unemployable poor; provided for not only the buried, but it still leaves a body of adult without a legal claim on parochial assistance. Each parish is allowed to decide whether the requisite sum for the relief of the poor shall be found by the rate-payers for immediate relief, or assessment, and if by assessment, how certain properties shall be classed; but having once decided in favour of assessment, they cannot retract such decision without the consent of the board of supervision. The voluntary system had been the custom, and cost of 660 parishes in Scotland, only 260 were legally assessed in 1842-43; these have been gradually increased, so that now (1858) there are but few in which a legal assessment has not taken place. Although the Act was brought into immediate operation, it was some time before the registers and accounts could be reduced into proper form. Officers and inspectors were alike inexperienced. But according to the best returns the commissioners could obtain from the several parishes, the expenditure for the year ending February 1, 1845, was 282,615L. From the returns made in 1843 it appeared that from all sources there was raised for the relief of the poor in 1836 the sum of 171,047L., and 216,481L. in 1841; the amount having gradually increased in every subsequent year. The number of poor in those years is not stated, but it is known that in 1841 there were 63,070 on the poor roll. In the year ending February 1, 1846, there had been raised 306,042L., of which 292,232L. were expended in poor relief.

In the autumn of 1846 the potato rot visited Scotland, and again in 1847, it caused a vast amount of distress, particularly in the Western Highlands and Islands of Scotland. Government aid was offered, and poor-houses and medical relief were strongly recommended, and in most instances adopted, particularly that of medical relief. For the year 1848, the number of poor was given in the annexed table. The years end on the 14th of May.

<table>
<thead>
<tr>
<th>Registered poor</th>
<th>Casual poor</th>
<th>Medical relief</th>
<th>Poorhouse buildings</th>
<th>Other expenses</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1847</td>
<td>356,115</td>
<td>35,340</td>
<td>12,870</td>
<td>49,181</td>
<td>435,915</td>
</tr>
<tr>
<td>1848</td>
<td>406,886</td>
<td>53,584</td>
<td>30,340</td>
<td>10,071</td>
<td>475,783</td>
</tr>
<tr>
<td>1849</td>
<td>417,403</td>
<td>51,470</td>
<td>33,011</td>
<td>14,776</td>
<td>497,344</td>
</tr>
<tr>
<td>1850</td>
<td>410,130</td>
<td>49,549</td>
<td>34,011</td>
<td>16,773</td>
<td>481,965</td>
</tr>
<tr>
<td>1851</td>
<td>404,219</td>
<td>52,018</td>
<td>20,311</td>
<td>21,576</td>
<td>483,920</td>
</tr>
<tr>
<td>1852</td>
<td>401,554</td>
<td>24,967</td>
<td>12,436</td>
<td>21,186</td>
<td>455,868</td>
</tr>
<tr>
<td>1853</td>
<td>411,138</td>
<td>24,116</td>
<td>21,757</td>
<td>21,645</td>
<td>459,512</td>
</tr>
</tbody>
</table>

During these years the highest number of the poor on the register was 82,357 in 1849, the lowest 69,433 in 1846; the greatest number of casual poor relieved was 126,568 in 1844, the lowest 46,091 in 1852. The number of insane or fawning poor average about 2550; and the number of orphans or deserted children have increased from 4794 in 1847 to 5828 in 1853. The figures for the preceding years are but little in their details, showing chiefly an increase as the system extends, and we therefore give the latest published. In the year ending May 14, 1857, the total amount expended in poor-law relief was 629,348L., including 27,577L. on buildings, on medical relief 61,553L., on legal charges 27,977L., and on management, 7398L. The number of registered poor who received relief in the year ending May 14, 1857, was 88,082, a decrease of 10,740 from the previous year; and the casual poor receiving relief amounted to 36,545. The number of poor-houses in 1856 numbered 30, belonging to 190 parishes, either singly or by combination. Making accommodation for 10,000 persons, of which 294 in 1848 increased to 16 others were added in 1857. The number of registered poor on the 14th of May, 1857, was 62,017. (History of the Poor Law. By Sir George Nicholls.)
PORPOISE, or PORPESSE. [Wales.]

PORT HOPE. [Canada, S. E.]

PORT LINTON. [South Australia, S.]

PORT MACquarie. [New South Wales, S.]

PORT PHILLIP. [Victoria, S. E.]

PORTER, ANNA MARIA, born at Durham about 1751, was the youngest child of a family all of whom attained considerable celebrity. Her eldest brother was an eminent physician; her eldest brother was the Rev. Mr. Porter; her eldest sister was Jane, the subject of the following notice. When only a few months old her father died, and the mother, for the sake of educating her children economically, removed to Edinburgh. As a child her quick and original perception of the precious and intelligent child attracted the notice of Sir Walter Scott, then a youth, who delighted in relating tales to her, and this probably led to her own early attempts in the same line. While still almost a child she had written 'Artless Tales' in two volumes, which were issued in 1793 and 1795, of which she afterwards regretted the publication. Her mother had before this time removed with her family to London, and subsequently, with her sister Jane, they settled first at Thames Ditton, and finally at Esher. After the death of her mother in 1811, while travelling in hopes of restoring her delicate health, she was attacked by typhus fever, and died on June 21, 1832, at the seat of Mrs. Colonel Booth, Montpellier, near Bristol. Her literary productions were, until her death, little known to the public, but she had published numerous novels, among which 'The Hungarian Brothers,' 'Don Sebastian,' 'The Recluse of Norway,' 'The Village of Mariendorp,' 'The East of St. Magdalen,' and 'The Knight of St. John,' enjoyed and retain considerable popularity. Her novels have some of the several maxims and plots of sentimental novels, and show skill in the management of the story, and some discrimination of character; but her heroines and heroines too often possess a superhuman excellence that becomes part of 'The Folly,' a work published anonymously, and are intended to inculcate kindness to animals. In 'The Barony' she has developed her religious feelings. She also published a volume of poetry, 'Ballad Romances and other Poems,' in 1811, of no great value.

Her other sister, sister of the preceding, was born in 1776. Her life followed that of her sister, with whom and her mother she constantly resided till their deaths. She, too, as she described herself, 'became a wanderer,' living with one or other of her friends till, in 1842, she went with her brother to St. Petersburg. On his death she returned to England, and resided with her eldest brother, the physician at Bristol, where she died May 24, 1850. Miss Jane Porter did not adventure into the field of literature. Sister Mary was not a member of the butterflies of the society, but she was better prepared, but she has the same fault in the unmitigated excellence or depravity of her characters. Still, in many of her characters there is a firmer delineation, and perhaps somewhat greater knowledge, though not very rigidly adhered to, of the particular time of the story. Her first work was 'Thaddeus of Warsaw,' published in 1803, which was extremely popular, and procured for her the admission as a canoness into the Teutonic order of St. Joachim, and a complimentary letter from Kossiakin. In 1809 she published the 'Scottish Chiefs,' a romance of Wallace and Bruce, in which there is considerable vigour of description, some character, but a total misconception of the condition of the time. Wallace and Bruce are depicted as Rizzio and the deposed. To these are added the 'Pastor Fidei' and 'Duke Christian of Lounberg,' the latter said to have been suggested by George the Fourth. She next joined with her in 'Tales round a Winter's Hearth,' and these were succeeded by 'The Field of Forty Footsteps,' founded on a London tradition connected with the spot where now stands University College and Hospital, and which was almost immediately dramatized. After a considerable interval, during which she contributed largely to periodical works, unnoticed by anyone of the story of her African traveller, in the 'Naval and Military Journal,' she published anonymously in 1831 'Sir Edward seaward's Diary,' in which she so successfully imitated the style and adhered so closely to the manners and history of the period, that it is still read whether or not it was a fiction. This was her last work.

PORTER, GEORGE RICHARDSON, was born in London in 1792. He was educated at Merchant Taylors' school, where he became intimate with the Ricardo family, and subsequently married the sister of David Ricardo. His father, a merchant in London, designed him for his own profession, and he became a sugar-broker. He was unsuccessful in trade; but his commercial knowledge was made available for literary objects. In 1830 he published a work, 'On the Establishment of the Sugar-Cane.' A paper on 'Life Assurance' was published in the 'Companion to the Almanac for 1831.' In the same year 'A Treatise on the Origin, Progressive Improvement, and Practical Results of the Method of Cultivation of the Sugar-Cane.' A paper on 'Life Assurance' was published in the 'Companion to the Almanac for 1831.' In the same year 'A Treatise on the Origin, Progressive Improvement, and Practical Results of the Method of Cultivation of the Sugar-Cane.' A paper on 'Life Assurance' was published in the 'Companion to the Almanac for 1831.' In the same year 'A Treatise on the Origin, Progressive Improvement, and Practical Results of the Method of Cultivation of the Sugar-Cane.'
PORTUGAL.

The political divisions of the Kingdom of Portugal, with the area and population of each, are as follows:—

<table>
<thead>
<tr>
<th>Province</th>
<th>Districts</th>
<th>Area in Square Miles</th>
<th>Population in 1861</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alentejo</td>
<td>Portalegre</td>
<td>2,382</td>
<td>86,175</td>
</tr>
<tr>
<td></td>
<td>Evora</td>
<td>2,609</td>
<td>86,517</td>
</tr>
<tr>
<td></td>
<td>Beja</td>
<td>4,991</td>
<td>125,167</td>
</tr>
<tr>
<td>Alto</td>
<td>9,982</td>
<td>297,999</td>
<td></td>
</tr>
<tr>
<td>Algarve</td>
<td>Faro</td>
<td>3,140</td>
<td>143,851</td>
</tr>
<tr>
<td>Beira Alta</td>
<td>Viseu</td>
<td>1,291</td>
<td>302,070</td>
</tr>
<tr>
<td>Beira Baixa</td>
<td>Guarda</td>
<td>2,128</td>
<td>206,736</td>
</tr>
<tr>
<td></td>
<td>Castelo Branco</td>
<td>2,474</td>
<td>194,074</td>
</tr>
<tr>
<td></td>
<td>Portalegre</td>
<td>1,087</td>
<td>359,583</td>
</tr>
<tr>
<td></td>
<td>Aveiro</td>
<td>1,488</td>
<td>247,103</td>
</tr>
<tr>
<td></td>
<td>Coimbra</td>
<td>1,527</td>
<td>261,956</td>
</tr>
<tr>
<td>Entre Douro e Minho</td>
<td>Viana</td>
<td>9,765</td>
<td>1,526,590</td>
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<tr>
<td></td>
<td>Braga</td>
<td>2,944</td>
<td>184,339</td>
</tr>
<tr>
<td></td>
<td>Braga</td>
<td>1,086</td>
<td>297,999</td>
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<tr>
<td>Estremadura</td>
<td>Leiria</td>
<td>3,132</td>
<td>140,114</td>
</tr>
<tr>
<td></td>
<td>Santarem</td>
<td>2,315</td>
<td>161,342</td>
</tr>
<tr>
<td></td>
<td>Lisbon</td>
<td>5,615</td>
<td>423,705</td>
</tr>
<tr>
<td></td>
<td>Vila Franca de Xira</td>
<td>7,242</td>
<td>725,161</td>
</tr>
<tr>
<td>Tejo e Montes</td>
<td>Braganza</td>
<td>3,374</td>
<td>296,617</td>
</tr>
<tr>
<td></td>
<td>Villa Real</td>
<td>1,456</td>
<td>184,779</td>
</tr>
<tr>
<td>Total</td>
<td>35,189</td>
<td>3,467,025</td>
<td></td>
</tr>
</tbody>
</table>

In addition to the above political divisions, each of the sub-provinces or districts is subdivided into commaras (or judicial divisions), cancehlos (or communal divisions), and parishes. The total number of commaras is 111; of cancehlos, 379; of parishes, 2774.

PORTUMNA, Galway, Ireland, a market-town and the seat of a Poor-Law Union, is situated at the head of Lough Dergh, in 53° N. lat., 8° 12' W. long., 41 miles E.S.E. from Galway, and 94 miles W.S.W. from Dublin. The postoffice of Portumna was 1542, besides 147 in the Union workhouse. Portumna Poor-Law Union comprises 15 electoral divisions, with an area of 77,046 acres, and a population in 1841 of 30,714; in 1851 of 19,731. The town has been much improved by the increased trade of the Shannon. It contains the parish church, a handsome structure in the perpendicular style; a large Roman Catholic chapel; a dispensary; Union workhouse; and bridewell. The Shannon is here crossed by a causeway and wooden bridge 880 feet in length. Quarter and petty sessions are held in the town. Saturday is the market-day for provisions. Fairs are held six times a year. Portumna Castle, a fine baronial mansion, the seat of the Marquis of Clanricarde, was destroyed by fire in 1826.

POITOU. In the 'Penny Cyclopaedia,' vol. xxviii. p. 453, there was given under this head an account of the Post-office up to and inclusive of the improvements introduced by Mr. Rowland Hill. All that remains is to notice what has been done in the way of extension of the advantages derived from rapid and cheap intercommunication, and a few figures to show the enormous increase which has taken place. In 1858, as stated in the previous article, the total number of documents transmitted by post, including franked, public statues, and newspapers of which there were 44,500,000, was 155,453,855. In 1859 the new system was introduced, but 1860 was the first entire year of the penny postage, but then letters might be paid, or stamped, or were charged only. In that year 1,35,165 letters only passed through the post-offices of the Kingdom; the revenue derived from the post-office had been 1,640,088l. in 1839; in 1840 it only amounted to 492,614l. In 1845 the number of letters had reached 329,101,611, and the revenue 760,889l. The number of letters that took a part in the net revenue continued to increase rapidly. In 1848 the additional advantage was given of a book-post, by which single books could be sent, open at the ends, at a uniform rate of 6d. per pound. This privilege was gradually extended to the Border counties. In 1856 the rate of postage on printed sheets was reduced to one penny for a quarter of a pound, twopence for half a pound, and twopence extra for each fraction above half a pound; but if fourpence or morewards were sent the packet might contain any number of sheets written or printed, except that the writing must not be of the nature of a letter. The last regulation in 1857 is that the packet may contain, in every case, any number of sheets, written or printed, but the written matter must not be of the nature of a letter, and may consist of bound books, or maps or prints on rollers, or whatever is necessary to the safe transmission of literary or artistic matter, such packets, however, not to exceed two feet in length, depth, or width, and all must be open at the ends or sides. Such packets are also to bear the British Arms on the outer end of the packet, 3d. for 4 oz., 6d. for 8 oz., and then proceeding at the rate of 6d. for every 8 oz., or portion thereof, except to Ascension Island, the East Indies, Hong Kong, Australia, New Zealand, the Indian Ocean, or the Great Eastern, in each of which all the additional 3d. is charged, and the weight is restricted to three pounds. By various conventions the foreign postage of letters has been materially reduced, in some cases 50 per cent, and in others varying from 17 to 20 per cent. The rates to all the British Colonies were reduced to an uniform rate of 6d. per half ounce, payable in advance.

The fourth annual report of the Post-office for 1857 states that the total number of letters delivered in the year was 504,421,000, of which 410,000,000 were in England and Wales, 42,806,000 in Scotland, and 31,612,000 in Ireland. These numbers give an average, in England, of 21 letters for each person of the population (in London it amounts to 43 for each), in Ireland to 7 for each, and in Scotland to 16 for each person. The number of newspapers passing through the Post-office was 71,000,000, about three-fourths of which bore the newspaper stamp. The number of book-packets was about 6,000,000. There were 580,000 newspapers, and 1,700,000 letters that from various causes could not be delivered, chiefly illegible or unlegible, for which the post-office paid 6d. for 4 oz., and the gross revenue was 2,928,858l.; the cost of management 1,720,615l.; and the net revenue 1,322,237l. The cost of management includes the following items:—Salaries, pensions, &c., 945,974l.; buildings, 25,077l.; conveyance of mails by land and sea, 25,977l.; expenses of the post-office, 11,725l.; wages of stamp-keepers, 105,000l.; by mail-packets (when paid for by the Post-office) and private ships, 12,268l.; for manufacture of postage-stamps, 35,065l.; miscellaneous, including conveyance of mail-bags, 16,357l. In 1857 the post-office received the conveyance of the postmaster-general, the conveyance of the mails through Egypt, clothing for letter-carriers and guards, rents, taxes, law expenses, &c., 109,672l. The business of the Money-order Office has also greatly increased; and, while it affords great advantages to the public in the transmission of small sums, has become a source of profit to the establishment. In 1857 the total number of money-orders issued in the United Kingdom was 6,386,702, to the amount of 1,210,273l., an increase of 91 per cent. In France it was 1,762,305, to the amount of 10,410,863l., were issued in England; 449,692, to the amount of 1,618,537l., in Ireland; and 518,874, to the amount of 950,872l., in Scotland. The commission gave a receipt of 9d. 6d. after the issue, in England, in 180,513, and in Scotland in 1180l.; in Ireland there was a loss of 616l. The number of orders gives an average of 1 for every 4 persons in England, for every 6 in Scotland, and for every 14 in Ireland. Money-order offices have also been established at Malta and elsewhere.

In 1855 some important improvements in matters of detail were introduced with great success. Country letters to London, or passing through London, were either sorted at the provincial offices or during their transmission, and this expedited the morning delivery. London by near an hour. Pillar letter-boxes were also erected in London, Edinburgh,
Dublin; they have been since extended to most considerable places in the United Kingdom, and of these there are now 703. London was also divided into 10 districts, each having a district head-office, by which letters posted in a district for a post-office, requiring to be transmitted to another not being in the same city, were conveyed by a transmission to the chief office, and thus a more speedy delivery is attained; and this division also greatly facilitates the sorting of inland letters; but to effect this the initial letters of East Central, West Central, North, East, South, West, North-West, South-West, South-East, and North-East must be distinctly placed at the end of the direction after 'London.' A book, price one penny, has been published, distinguishing all the streets and places within the different districts.

Nearly every town of any size throughout the three kingdoms has at least two deliveries a day from and to its metropolis and the larger provincial towns. In 1856 there were 52 such towns added to the list; for instance, in 1856 Manchester has four daily communications daily with London, Birmingham, Oldham, Bradford, Ashton-under-Lyme, Halifax, Sheffield, Wakefield, and Cheetham; seven with Liverpool; and five with Leeds, Stockport, Rochdale, and Bolton; twenty-nine mails are despatched from, and the number received at, the Manchester post-office every day. In 1866 the mails within the United Kingdom were conveyed daily over 129,480 miles of way; of this 20,172 miles are by railway at an average rate of ¾d. a mile; 25,997 by coaches, mail-carts, &c., at an average rate of Id. a mile; 63,450 by sea; an average rate of ½d. a mile; and 2879 by packets and boats between different places in the United Kingdom, at rates varying from 5d. ¾d. a mile to 4d. The total number of persons engaged in the service of the Post-Office in the United Kingdom has now become nearly 29,000. On December 31, 1857, including 1 postmaster-general; 5 secretaries, assistant secretaries, and secretaries for Ireland and Scotland; 15 surveyors; 19 other superior officers, such as heads of departments, chief clerks in the Metropolitan office, &c., 11,101 postmasters, 6116 clerks (exclusive of some employed temporarily); 204 guards; 10,427 letter-carriers, messengers, &c.; 8 marine officers; 125 postmasters, clerks, &c., in the Colonies; and 51 agents in foreign countries. Of these 11,101 postmasters are allotted to the United Kingdom, and (including this number) about 3200 are employed in the London district.

The third annual report of the postmaster-general for 1856, in an Appendix, states that "in no part of the United Kingdom has more been done for the welfare of the people by the use of railways for carrying mails and by the penny postage system than in Ireland." In 1874 there were posts six days a week on only four lines of road; letters to all other districts were carried only three days a week. Now there are daily posts to almost every village, and but one important town that has not two daily mails both with London and Dublin. In 1784 the whole expense of the office in Ireland was 15,000l., including salaries of provincial postmasters and their clerks. At present the amount of mail only was allotted to the provinces; the sum now (1856) allotted for the like service is 124,000l., divided thus:—conveyance of mails by railways, 65,500l.; by coaches and cars, 27,162l.; by foot-messengers, 10,334l.; and salaries and wages paid in provincial offices, 31,122l. In 1829 the cost of conveying the mail by mail-coaches was nearly four times the average rate of England; this excess has now disappeared, and in 1856 the average rate per mile was for England 11½d., and for Ireland 16d., and for Scotland 15½d. The same paper pays the following just tribute to the exertions of Mr. Bianconi for the improvement of intercommunication in Ireland, particularly in reference to the transmission of letters. In 1815, Mr. Bianconi first carried his Majesty's mails in Ireland; but he did so for many years without any contract. He commenced in the county Tipperary, between Cannel and Cahib; and he then made his own bargain with the post-office, that he should carry the whole mail of many small postmaster usually retained one moiety of the sum allowed, as his own perquisite, and Mr. Bianconi performed the work for the remainder. What Mr. Bianconi received was thus very small; and he was hot and would not therefore run at any hours inconvenient to himself past his accustomed road, but was convenient to him. From 1830, when the English and Irish offices were amalgamated under the Duke of Richmond, the public, as Mr. Bianconi says, got something like fair play; and he and others were allowed to carry the mails by direct contract with the Post-Office. From that time till 1848 Mr. Bianconi continued to increase his establishment; and in the latter year he had 1,460 horses, and daily covered 3,600 miles. The opening of railways was, however, a great check to his business, and in 1855 he was entirely interfered with this traffic, as to expel his cars from all the main lines. But Mr. Bianconi has met the changes of the times in a resolute spirit. He has always been ready at a moment's notice to move his horses, cars, and men to any district, however remote, where any considerable amount of mail was of itself, and not through the winter of 1855-56, when nearly the whole of that district in which he was working ten years since has been occupied by railways, he still daily covers 2980 miles, and is the owner of a large and well-arranged establishment, now working in the town of Wexford in the south-east, to the mountains of Doneygal in the north-west. Mr. Bianconi has done the State good service. By birth he is, as is well known, an Italian, but he is now naturalised, and England, as well as Ireland, should be ready to acknowledge his services. Perchance he may be persuaded that no living man has worked more than he has for the benefit of the sister kingdom.

The amount of postage collected at different towns in the United Kingdom (including the postage-stamps sold by the Post-Office and by the Board of Inland Revenue) shows some curious results. London, of course, through which pass nearly one-half of the total correspondence of the kingdom, attains a great predominance, the amount in 1857 being 159,900,000l., including 15,800,000l. for the delivery of mail-coaches, 104,655l., while Manchester, with 316,000 inhabitants, only contributes 97,756l.; Birmingham, with 322,000 inhabitants, but 42,107l. Bristol, with about 100,000 inhabitants (including Bedminster), furnishes 31,364l.; and Leeds with 272,000 contributors 28,100l. Now these are considerably more than 135,000 inhabitants, no more than 16,565l. In Ireland the contributions are more in accordance with the size of the towns:—Dublin contributes 60,391l.; Belfast, 16,547l.; Cork, 11,914l.; and Limerick 5,276l. In Scotland,—Edinburgh, with 160,000 inhabitants, contributes 59,177l.; and Glasgow, with 358,000 inhabitants, only 68,871l. It must be recollected, however, that in many cases some towns are used as a sort of depot, from whence postage-stamps are distributed to the various under-postmasters.

POTATO, SWEET. [Botany.]

POTTINGER, RIGHT HON. SIR HENRY, Bart., G.C.B., was born in 1789, of an English family which had been long settled in Ireland. He was the fifth son of the late Edward Curwen Pottinger, Esq., of Mount Darragh, in the county of Down, by Anne, daughter of Robert Gordon, Esq., of Florida Manor, in the same county. He went to India as cadet in 1804. At an early age he attracted the attention of the civil and military authorities, and was particularly recommended for his capacity, as well as his ready store of information bearing on his profession. Rising by gradual steps, he became successively judge and collector at Ahmednaggar in the Deccan, political resident at Cutch, and president of the regency of the Bahawalpur State. In 1833, he was appointed a baronet, when General Kane was rewarded with a peerage after the Afghan campaign in 1839. He had scarcely returned to England when war broke out between England and China on account of differences relating to the opium trade. In this emergency he was sent out to China as ambassador extraordinary and minister plenipotentiary, and superintendent of the British trade in that country; and in this two-fold capacity he took very decisive measures. Having been appointed governor-general of India, he returned to India, where he and his able assistants, the Earl of Clonmacnoise, Sir W. Parker, the result of which was the capture of Amoy. The effect of this step was to throw open to English vessels a commerce with upwards of 300,000,000 natives, and the terms of the treaty were thought to be such as to add a guarantee against the necessity of the repetition of offensive measures. For these services Sir Henry Pottinger was made a Knight Grand Cross of the Order of the Bath, and governor-general of the presidency of the Indian Government; and returned to England in 1844, he was sworn a member of the Privy Council, and a pension of 1000l. a year was settled on him by a vote of the House of Commons. In 1846 he was again sent upon active service as successor to Sir Benjamin J. Hamley, at the head of a British force, which he had held until the September of the following year, when he returned to India as governor and commander-in-chief of the presidency of Madras. He returned to England in 1854, having previously been raised to the local rank of lieutenant-
PREROGATIVE COURT. One effect of the transfer of the jurisdiction of all the Ecclesiastical Courts to the Court of Law was, that the业务 Relatio notabilita has ceased to exist. This court, whose jurisdiction arose from the possession of bona notabilita by the deceased person in two dioceses, has consequently, although without formal abolition, altogether disappeared from our judicial system.
French. In 1819 he received holy orders, and in 1825, after performing for thirteen years the duties of various curacies near Chirkwidd, he was appointed to the vicarage of Cwmdu. This was his last preference. The rest of his life was passed in his professional labours, and in a great variety of voluntary pursuits. Mr. Price carved in wood, modelled in wax and cork, etched with some skill, could play on the Welsh harp by ear, and had the honour of presenting a harp from his own design to the Queen at Buckingham Palace, in 1842. He was a great Delaware of drawing, some of which were engraved as early as 1809, in his friend Theophilus Jones’s ‘History of Brecknockshire.’ He was a great promoter of the Esteeds, or meetings for the cultivation of Welsh learning and music, which were voluntarily born of the prizes. He was looked up to by most of his countrymen with enthusiastic admiration as an accomplished champion of his country’s language and literature. His health began to fail somewhat early, and he died at Cwmdu on the 7th of November 1848.

The best of his English works are collected in the ‘Literary Remains of the Rev. Thomas Price, with a Memoir of his Life by Jane Williams, Ysgafell,’ 2 vols, 8vo, Llandover, 1866-68. The first volume contains an account of a ‘Tour through Brittany,’ made in the summer of 1820, written in a lively and agreeable style, and peculiarly interesting as containing the observations of one familiar with the language and literature of Wales on the kindred language and literature of France. Mr. Price’s Memoir of the Remains of Ancient Literature in the Welsh, Irish, and Gaelic Languages; ‘An Essay on the Influence which the Welsh Traditions have had on the Literature of Europe;’ ‘A Critical Essay on the Language and Literature of Wales from Gruffydd ap Gwna to Ysgafell’ (in the eleventh century) to that of Sir Gruffydd Llwyd and Gwilym Ddu’ (in the fourteenth,) make up the remainder of the first volume. The second is entirely occupied with Miss William’s memoir, which is extensive and interesting comparative information, and presents the fullest picture that has ever been drawn of a Welsh literary life. By far the greater part of Mr. Price’s literary labours were in his native language: he was a contributor to fifteen Welsh periodicals, for which he made a selection of articles once a month, and under such a variety of signatures, that it would now be impracticable to form a collection of the whole. His favourite signature however was ‘Carn-Hasanes’ (‘Man of the Sunny Mound’), which was familiarly known to every magazine-reader in Wales. His great work in Welsh was the ‘Hanes Cymru a chenedi y Cynyr y Cynoesoedd hyd at Farwoloth Llewyn ap Gruffydd’ (‘History of Wales and the Welsh Nation from the Early Ages to the Death of Llewelyn ap Gruffydd,’ when the Welsh country was united with England. It was published in numbers, sometimes with long intervals, the first of the fourteen of which it consisted appearing in 1836 and the last in 1848, the whole forming a volume of about 800 pages. It contains a complete compendium of the best history of Wales extant in any language, and it is somewhat singular that no translation has yet appeared in English. The omission may serve in some degree to justify the complaint which Mr. Price was accustomed to make of the extraordinary neglect of Welsh literature and total ignorance of British History prevailing in England, and the consequent contempt evinced by the English for everything relating to Wales, in contradistinction to the high appreciation of Welsh living in Great Britain and the superior knowledge and desire for information on all subjects connected with the principality by the principal British scholars.’

On the subject of his native language, Mr. Price was so enthusiastic that his feelings sometimes outstripped his judgment. At the Eisteddfod at Welshpool in 1834, he exclaimed, in an oration in the Welsh language, ‘We are told our language cannot last; but let them inform us what language will last, and we will support it. We are not chafed and goaded to—it when we are satiated with the extinction of our native tongue—shall we not reply! shall we not say that we likewise perceive the seeds of decay in the English! Who can tell but that when the present English sleeps with the sleep of death, what language will ascend to the throne of empire? But our mountain tongue may yet rise some remains of the Britons to patriotism and glory.’ Most Englishmen, we believe, who have urged the adoption of the English language in Wales, have supported the measure not on the ground of its supposed superior duration in the future, but of its evident superior usefulness in the present.

A notion of Mr. Price’s, to which he appears to have attached considerable importance, was, after communicating it to the ‘Athenaeum’ and the ‘Allgemeine Zeitung,’ made the subject of a separate publication, ‘The Geographical Progress of Empire and Civilization’ (Llandover, 1847-48). Every one is familiar with the ideas of the ‘westward progress of empire,’ which the Americans are so fond of quoting from the writings of the ancients. Mr. Price, however, had made a discovery, ‘that the average rate of progress corresponds with that of the retrogradation of the equinoctial points, which is 60 seconds and a fraction in a year, and that every part of the globe, in consequence, forms a subject to periodical retardations and accelerations.’ ‘The focus, or pole, was in 1847,’ according to his speculations, ‘located in the northern portion of this island, near the Frith of Forth in Scotland, moving in the direction of the Somny Frith at the rate of four miles a year.” In the whole, Mr. Price’s works are more remarkable for vigour, animation, and learning, than for sound judgment.

PRICHARD, JAMES COWLES, an eminent ethnologist, was born at Ross in Herefordshire in the year 1795. He was educated for the medical profession, and took his degree of M.D. at Edinburgh. He chose for the subject of his inaugural thesis the physical history of mankind. This seems to have determined the current of his thoughts throughout his life. He published a number of works, among which are the most laborious ethnologists of his day. He commenced the practice of his profession at Bristol, and in 1810 was appointed physician to the Clinkon Dispensary and St. Peter’s Hospital. He also had a private dispensary, to which he brought a number of his patients. He was never able to unite with his professional duties, he still kept the subject of his inaugural thesis before his mind, and in 1813 he published his ‘Researches into the Physical History of Mankind.’ This work, which was originally published in one volume, was issued in a second edition in 1826, and a third edition was finished in 1849, extending to five volumes. From the period of the first publication of this work it took the first rank amongst ethnological works, and the last edition is still considered an important work that has hitherto appeared upon the physical history of man. Dr. Prichard, whilst an anatomist and physiologist, was one of the first to avail himself of the study of philology as a means of arriving at the history of the various races of men. His contributions to ethnology took a variety of forms. In 1832 he read an elaborate paper to the British Association, then assembled in Bristol, ‘On the Application of Philological and Physical Researches to the History of the Human Species.’ In 1834 he read a paper before the Royal Society on his labours on the physical history of man under the title of ‘The Natural History of Man.’ A second edition of this work appeared in 1845, and it has been translated into the French and German languages. He has likewise written some important papers on the physical sciences; the twelfth volume of the proceedings of the Zoological Society is a paper ‘On the Cranis of the Laplanders and Finelanders.’ He also published a work ‘On the Eastern Origin of the Celtic Language,’ in which he pointed out the relations between the Celtic languages and the great group of Indo-European languages derived from the east. Another work also arose out of his ethnological researches, which was entitled an ‘Analysis of Egyptian Mythology.’

All his writings were great and important department of science, Dr. Prichard was not inattentive to professional studies. His ethnological and philological reading naturally led him to contemplate man psychically, and we find him addressing himself successfully to the study of the nervous system, and the results of its deranged condition on the mind of man. In 1829 he published a work ‘On the Diseases of the Nervous System.’ This was followed by a ‘Treatise on Insanity.’ In this work he displayed great power in analysing mental phenomena, one of the first authorities on the subject of mental derangement. He was appointed visiting physician to the Gloucestershire Lunatic Asylum. He subsequently published a work ‘On the Different States of the Nervous System,’ a sequel to the one mentioned above. His contributions to the labours connected with insanity led to his appointment as one of the Commissioners of Lunacy in 1845. On this occasion he removed from Bristol to London, where he continued to reside till his death. Besides the works already

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mentioned, Dr. Pritchard enlarged an essay which he read before the Philosophical Society of Bristol into a work entitled *The Influence of the Earth on Man.* He was also an extensive contributor to the *Cyclopaedia of Practical Medicine.* He was made M.D. of Oxford on the occasion of the installation of the Duke of Wellington as chancellor of that university. He was president during one session of the Royal Society of London, and md many other scientific societies, including that of the Surgeons. He was also president of the Ethnological Society, and published an anniversary address delivered before that society. He was a fellow of the Royal Society of London, and of many other scientific societies, including that of the Surgeons. He was also president of the Ethnological Society, and published an anniversary address delivered before that society.

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London Illustrated News," and other newspapers having a large circulation. In this machine a central drum 206 inches in circumference is the central axis, turns on a horizontal axis. We copy the following description from C. Tomlinson's "Cyclopedia of Useful Arts and Manufactures." "The ink-stand and the columns of type are secured to the surface of this drum; the columns of type are placed vertically, and the face of type is theiphery of the columns. If any line is to be printed, the columns are moved to that line in the following manner. A slab of iron is curved on its under side, so as to fit the large cylinder, while its upper surface is fitted into facets, or flat parts, corresponding with and numbered with the width and number of the columns of the newspaper; between each column there is a strip of steel, with a thin edge, to print the 'rule,' the body of this strip being wedge-shaped, so as to fill up the angular space left between the columns of the type, and to press a second too soon or too late, the relative position of the columns on one side as compared with those on the other side of the paper will be out of register by 1-70th of an inch, viz., one inch; in which case the edge of the printed matter on one side will be an inch nearer to the edge of the paper than on the other side. This is prevented by having it to do as, to draw forward the sheets so as always to have the edge of one ready for the machine to take in. When the steam-engine which works the machine be put on a greater speed, the central drum, and all the attendant contrivances for the preparation of paper and the rapidity of which the place on close to present them; but only at those periods, rapidly recurring though they be, which are provided by the peculiar functions of the machine."

This machine, with certain modifications to adapt it for printing in America, in one of which it has been improved for the "Illustrated News," and was shown at work during the Exhibition of 1851; it has also been adopted in other instances where rapidity of production was necessary. Another machine, like that on the vertical principle, has been invented by the Messrs. Hove, of America, and several of those have been brought into use in London.

The inventive faculty has also been applied to methods for facilitating the arrangement of the type, with far greater effect than the above. Mr. James L. Tomlinson, of the Paris Exhibition of 1855, Mr. Knight says:— "During the last twenty years there have been various attempts to produce a machine that will, to some extent, supersede that portion of manual labour in printing which is called 'composition.' The composition of type is the process of putting together the letters of which a larger and more rapid machine might have been made, which a more rapid method of arranging moveable types was to be effected than by the ordinary method, it may be sufficient to say that by keys, like those of a pianoforte, some force might be applied to remove a single letter from its proper receptacle, and arrange it in a combination of words and sentences. In the ordinary method, the various types which are necessary for the usual language lie in separate cells before the compositor, those most in use being nearest to him. He has to lay each sheet of paper, to which, picking up letter by letter, he forms words, putting spaces between each word. As he approaches the end of his line, he finds that the next word is too long to come within the line, and he therefore divides it by a hyphen, or carries it over to the next line. He then proceeds on the same, so as to make the line fit closely, but not tightly. Now it is evident that if the most perfect instrument could be made to pick up the letters and spaces, the intelligence of the workman being entirely dispensed with, the process would be such as to call each of line. Hence every composing-machine must be an imperfect instrument.

But, nevertheless, it may in some cases be of the utmost importance to have the type picked up, and placed in order immediately after it has been run through the machine. In the case of an expedition between the logographic system of Major Benkowski, and the common mode (in which trial Mr. Rennie was referee), it was found that a compositor at Mr. Clay's printing-office picked up and 'insisted' 6000 letters in two hours and twenty minutes. He distributed or returned the same when used, to the case in fifty-one minutes. There were several composing and distributing machines in the French Exhibition, but the most remarkable one, and that which appeared most useful as it appeared to M. Didot and other competent judges, to approach nearer than any other invention to the accomplishing of this long sought for object, is thus entitled—'Machine à composer et mettre a l'usage du typographie, composée par Christian Börosen.' It was stated that a Copenhagen newspaper, of which a copy was shown, had been printed for some time by this method. It would be impossible to convey an adequate notion of the details of this machine without drawings. I will endeavour to convey, however, a faint idea of its general design. The columns of type are disposed in such position that the type is displaced. But of 111 sheets there are three in the first, each letter has two, three, or four nicks cut at its right and left letter being the same as another. A cylinder, which may be described as a large basin, has a number of metal edges placed vertically in its sides, upon which the types without any regard to order, being the matter for distribution, are rapidly slid by the dovetail nick.
When the basin is filled, it is inverted upon a cylinder of
considerable size below. Upon the rim of this cylinder is
a separate opening for the reception of each of the 111
letters, but no one opening is like another. The distributing
and the composing go on at the same time. The composition
is seated; with a treadle he moves the upper cylinder, which,
as it slowly revolves, finds in the lower cylinder, which is
stationary, a fit place for every separate letter as it descends
by its own gravity to the bottom of each metal edge. The m
happening to be composed of about a pound of gold. The
other at the same distance from its bottom, falls into the
\( m \) opening, which having points corresponding, alone can
admit it from its similarity of form, while the \( n \) having four
nicks, two broad and two narrow, passes into its own division,
and is cast as before.

"But whilst this process of distribution is steadily pro-
ceeding, without any care but to keep the upper cylinder
occasionally supplied with new material for its operation, the
process of composition is naturally, at the same time. The composi-
tion sits before a compact little frame of keys, each key having
a connecting wire for each division of the lower cylinder. He
strikes a key and the lower letter is instantly detached and
falls into a funnel-shaped receptacle below, where, without
being inverted in any way, it runs into a groove, and ranges itself
in its proper order, in the line of its fellows. This is a long
line of several feet. By an ingenious contrivance each such line is passed on one side, as it is completed, to
another compositor at the same time, his hand moving with
the due width of his page or column, and spaces out the
words in the ordinary way. I saw 1000 letters thus placed
in line in the short space of four minutes, and the spelling
and punctuation appeared as correct as in most matters of
composing, that can be performed by hand. A loss of time in
refilling the cylinders, and through other hindrances, is taken into account, it was stated by the ex-
hibitor that 60,000 types are set up and distributed each day.
This gives a rate of about 6000 an hour, which is treble that
of the ordinary compositors.
The interest connected with the question of 'Types for the
Blind,' to which considerable impetus was given by the
Society of Arts for Scotland at Edinburgh, which offered their
prize of \( 50 \) guineas for an invention that would greatly bring about a change in the intellectual education
of the blind. The publication of the article Burn in the
'Penny Cyclopaedia,' at a time when the minds of many
were thus directed, and the strictures therein contained on
the absence of intellectual training in most of the asylums,
also rendered essential benefits on this point. Dr. G. S.
Howe, of Boston in the United States, in 1833 contrived an
alphabet, founded upon that of Halli, of a very compact
form, in which the New Testament was printed in 1835 and
in 1836. The late Mr. John Alston, the treasurer of the
Glasgow Asylum, than whom no man connected with the blind deserves more honourable mention, contributed greatly to this educational movement. He contrived an alphabet, a little more
or less arbitrary, the evil which would follow is of isolating
the blind by putting them in a position to require special
teachers. He therefore adopted the plain Roman characters
derived of their small extremities—the same as that of
founders; and, finding that it would be easily read, it would
also enable any seeing person who could read to be a
teacher of the blind, be at once procured founts of type,
and published several works in raised letters; the success of
these for the purpose, and the wide circulation of the word,
has been very remarkable.

Having thus inquired for several years, he visited
more than once the principal asylums for the blind in the
kingdom. In his work 'Statements,' &c., published in 1840,
he says, that after the introduction of his system, 'I found
a considerable improvement. Subsequently I visited the
English institutions a third time, and found a very great
number who could read with ease and intelligence; and I
have reason to know that there are some hundreds reading
these books. In the year 1840, 20,000 were printed in an
alphabet of the \( m \) kind. It may be added, that Mr. Alston
also brought out some beautiful embossed music and maps, and
that he published a 'Practically English Grammar' for
children, in 4to.

The paper used for these works is strongly sized, to
retain the impression. In order to account for the great
sight of the Bible, it must be borne in mind that the paper
can only be printed on one side, and that the letters require
to be of considerable size in order to be distinct to the touch.
The printing is effected by a copper-plate press. The types
being strongly relieved, and liable frequently to give way
under the heavy pressure required, it was necessary to have
them re-cut four times during the progress of the work.
The whole of the work was executed at the expense of the
Gallows Asylum, a man and a boy acting as com-
postors, there being one pressman, and the ordinary teacher
acting as corrector of the press. These books are now used in
many of our larger institutions. In the present state of the
print office of the Roman alphabet, unfortunately.

An invention by Aloys Uuer, of Vienna, called 'Natur-
selfdruck,' deserves mention. It by impressions are taken
from the natural objects themselves, and by an ingenious
process brought into a form fitted for printing from. Some
of the specimens produced, such as the veins and markings
of agate-stones, are of remarkable clearness and beauty.
The invention, with some improvements in the process, has been
patented by Mr. Henry Bradbury, and the 'Fern Flora of
the United Kingdom,' produced by him in a folio volume,
with 61 plates, is a proof of its capabilities of affording all
the advantages of a herbarium, without the defects; as well
as to its being available for many other branches of natural
history.

In type-founding also an ingenious machine has been
invented. In this, by turning a crank-wheel, the metal is
injected with considerable force into the type-mould, brought
by the machinery in front of a reservoir of metal kept fluid
by steam. It is blown through a pipe and released in a few
seconds; the metal so delivered out of it, at a rate varying from six to ten times
the rapidity with which the operation can be performed by
hand. Both in casting by hand, and in the machine, the
mould is liable to become obstructed by particles of the
metal remaining, which the most established courts, called
the Court of Probate. The functions of this court are con-
finen entirely to deciding upon the authenticity of wills,
and upon the proper persons to whom administration is to be
given, and to seeing that the property of deceased persons,
and the rights of the
ous parties who claim it beneficially, the court has nothing
to do. These matters must be decided by the courts of law
and equity, as before the passing of the Act. The duties of
the Court of Probate are merely to see that the administration
of wills and administration is established in London, and district registrars are established in forty of
the principal towns of England. The office or registry in
which probate or letters of administration are to be sought,
is no longer determined by the locality of the assets of the
deceased person, but by the place where the deceased had a
fixed abode at the time of death. Should the testator or
intestate have a permanent place of residence in one of the
districts in the time of his death, the place of residence
of administration may be obtained at the registry of the
district. The executors or personal representatives
may administer either by the local officer or the central
officer of the most convenient office of search for any will whatever.
The practice of the Court of Probate in all contentious
matters is thrown open to the whole legal profession, so that
the monopoly of testamentary business enjoyed by advocates
and practising solicitors is broken.
The court is presided over by a single judge, who sits at
Westminster. An appeal from his decision lies direct to the
House of Lords.

In cases where a person dies in one of the forty districts,
leaving personal property under 300L., and real property under 300L., the County Court of the district has jurisdiction should any contention arise. From the decision of the County Court judge, an appeal, which is final, lies to the Court of Probate.

One principal advantage of the new system lies in the removal of the contest, which is now a matter of litigation, to a new tribunal, and the old question of bona fide, on which the necessity of obtaining prerogative probate or administra-

raction was founded. The rules of evidence in the Court of Probate are to be the same as those in courts of law and equity, and suits for debt are likewise assimilated to those of the courts of common law.

PRODUCTICAE, a family of Brachiopod from Mollusca, in-
cluding the genera Producta, Strophalosia, and Chonetes. The shell is concavo-convex, with a straight-hinge line; of two valves which are closely articulated, furnished with tubular spines; ventral valves convex; dorsal concave; internal surface dotted with conspicuous funnel-shaped punc-
tures; dorsal valve with a prominent cardinal process; haxial processes (7) subcentral; vascular markings lateral, broad, and simple; adductor impressions dentritic, separated by a narrow central ridge; ventral valve with a slightly
notched hinge line; adductor sac central, near the umbo;
cardinal impressions lateral, striated.

PROSTOMIUM, the front part, head, and antehumerus of the body, and are sometimes also called bristle worms in a general sense. There are a great number of species. They are found ranging from the Devonian to the Peruvian rocks of North and South America, Europe, Spitsbergen, Tibet, and Australia.

PROTOCOPUS has its shell attached by the umbo of the ventral valve. There are 8 species.

Chonetes contains 24 species, which are found fossil in the Silurian from the Carboniferous rocks.

(P. Woodward, Treatise on Fossil Seals and Fossil Shells.)

PROME. [Barnes, Poi., S. 2.]

PROMBUC. [Antelope.]

Pronobus. [Barnes.]

PROPYLAE. [Chemist., S. 2.]

PROPOLIS. [Barnes.]

PROPUT, SAMUEL was born on the 17th of September, 1783, in Plymouth—the birthplace of so many English painters. From earliest childhood he was noted for an irre-

proachable honesty and unworldliness. He was of a quiet turn of mind, and the passion increased with his years. His associate in his early artistic studies was Benjamin Hayden, but instead of yielding to the eager impulses after an unattain-
able grandeur of his enthusiastic friend, young Prout con-
tented himself with unceasingly sketching from nature the ivy-mantled bridges, mossy water-mills, and rock-built cot-
tages, which characterise the valley scenery of Devon.'

Whilst uncertain as to his future course, he had the good fortune to be introduced to Mr. John Britton, the antiquary, who, at that period, was in the midst of his great work, the account of Cornwall, which he was preparing for the ' Bean-
ties of England.' [Burtton, John, S. 2.] Mr. Britton, pleased with his sketches, proposed that he should accompany him to France. The young artist was elated, and immediately accepted the offer. The portfolio of Cornish drawings which he afterwards transmitted to Mr. Britton, excited by their boldness of style considerable notice, and the young artist was easily persuaded to remove to London.

He associated himself with an artist who was then in London, and found an adviser and patron in Palmer the printseller, then residing in the Westminster-road and afterwards in Fleet-street, who used readily to purchase his water-colour drawings, and dispose of them among his customers. Palmer gave but low prices for these works, but Prout had the good sense, on comparing his pictures with those of the established artists, to recognise his own deficiencies; and he was well pleased to be thus enabled, by means of numerous drawings, to support himself whilst making a resolve to extend his artistic knowledge by study and executive skill. During these years he painted marine views, especially coast-scenes with fishing-craft, more than any other, architecture, for which a very decided inclination had not yet developed itself. He also devoted a good deal of time to teaching, and he stuck some lessons and studies for the use of teachers and pupils; but receiving the capabilities of the newly-introduced art of lithography for yielding fac-simile of the painter's pencil-sketches, he began early to draw on stone with chalk and wash, having bought a stone as a formidable art, he did with great facility. He published in 1816 a series of 'Studies' which met with great success, and was followed by 'views in the North and West of England,' 'Progressive Lessons,' 'Remains of Landscape,' and other works of the same kind. The presentation of a series to extend his artistic knowledge the reliability of the basis that class of publication far above the estimation in which it had been previously held, and did much to extend the reputation of the artist.

Mr. Prout had already secured a high position, when he was led in 1818—partly in the hope of restoring his health, which had become much enfeebled, but also with a view to turning to professional account the taste for foreign scenery engendered by the facilities for continental travel opened to him by the appearance of the 'Modern Repository,' and the quaint street-architecture of Rouen, and the civic and eccle-

siastical structures of other Norman towns, seemed to reveal in him an entirely new sense. From this time he gave him-

self, with undivided zeal and unapproached success, to the delineation of the weather-worn and mouldering remains of medieval architecture. Year after year he continued to journey through the fairest parts of France and Switzerland, of Germany and Italy; but still it was the old southern or Tuscan manner that enabled him to tumble down heavy-gabled domestic houses which, though hardly ranking among any of the architectural divisions, had in his eyes an equal attraction in their antique picturesque-

ness. The reliable table of reproductions of the engravings he published a handsome folio of lithographic 'Fac-Similes of Sketches made in Flanders and Germany.' This was the first of the numerous series of lithographic copies of painters' finished sketches which have added so greatly to the enjoy-

(Blackstone's 'Commentaries,' Mr. Kerr's edition, vol. ii. p. 416.)

PROTEIN. [Chemistry, S. 1; Tissues, Organic, S. 1.]

PROTOZOA, a term applied by Oken to the lowest forms of animal life. Protozoa has been applied to the same terms as the organism where a will operate. This presented the great distinction between the relief afforded by the bankrupt laws to a trader, and that obtainable by an insol-

vent debtor, or a petitioner under the Protection Acts.
PRUSSIA. The area and population of Prussia and its Provinces are as follows:—

<table>
<thead>
<tr>
<th>Province</th>
<th>Square Miles</th>
<th>Population in 1831</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Prussia</td>
<td>14,946</td>
<td>1,531,272</td>
</tr>
<tr>
<td>West Prussia</td>
<td>9,581</td>
<td>1,078,476</td>
</tr>
<tr>
<td>Posen</td>
<td>11,383</td>
<td>1,261,745</td>
</tr>
<tr>
<td>Pomerania</td>
<td>12,153</td>
<td>1,263,994</td>
</tr>
<tr>
<td>Silesia</td>
<td>15,695</td>
<td>2,175,171</td>
</tr>
<tr>
<td>Brandenburg</td>
<td>18,134</td>
<td>2,044,000</td>
</tr>
<tr>
<td>Prussian Saxony</td>
<td>9,747</td>
<td>1,829,732</td>
</tr>
<tr>
<td>Westphalia</td>
<td>7,786</td>
<td>1,204,251</td>
</tr>
<tr>
<td>Rheinis Prussia (Rhineland) and Holstein</td>
<td>12,769</td>
<td>2,072,180</td>
</tr>
<tr>
<td>Total</td>
<td>107,954</td>
<td>16,923,721</td>
</tr>
</tbody>
</table>

PSAMMA, a genus of Grasses belonging to the tribe Arundinaceae. It is known by its flower being enveloped in long silky hairs, the lower glume shorter than the upper, and its panicles being spike-like.

P. arenaria, Sea-Reed, Marram, is the only British species. It is found on sandy sea-shores, where its roots assist in binding the shifting sands.

PSOLIDVM, characterised by the singularly clever introduction and arrangement of his figures, ill-drawn as these often were. In a word, Prout may fairly be regarded as the founder of a new school of architectural painting. He first showed what a world of picturesque capability lay in the quaint streets and market-places of Normandy, Flanders, and Germany, and the grander palaces of Venice; and no less did he show how to render the broad features and deep sentiment of the old ecclesiastical gothic, without being lost in a multitude of petty details.

PROUT, WILLIAM, distinguished as a chemist and physician. He was brought up to the medical profession, and took his degree of Doctor of Medicine at the University of Edinburgh. On establishing himself in London he connected himself with the Royal College of Physicians, of which body he ultimately became a Fellow. He early directed his attention to chemistry, and was amongst the first in this country to attempt to apply this science to the explanation of the phenomena of life, and he published many papers in reference thereto. It is with the 'Philosophical Transactions' of the Royal Society of London that we have to do. Amongst the subjects of his researches and discoveries on this subject were combined in a great work entitled 'On the nature and treatment of Stomach and Renal Diseases, being an inquiry into the connection of these affections with the diseases of the Kidneys and Bladder with Indigestion.' However brilliant the discoveries which have been made subsequently to the publication of this work, there can be no doubt that Dr. Prout had correctly appreciated the importance of chemistry, in explaining the functions of living beings, and was the first physician who sought to apply the doctrines of modern chemistry to the explanation of the phenomena of disease. He was an exceedingly careful and accurate experimenter, and with regard to some of his conclusions, which were at one time thought to be too far-fetched, a more careful investigation has confirmed the truth of his views.

Dr. Prout was one of the gentlemen chosen to write the 'Bridge-water Treatises.' The subject of his essay was 'Chemistry, Meteorology, and the Functions of Digestion considered with reference to Natural Theology.' This work abounds with evidence of his profound knowledge of the laws of chemistry. Although principally occupied with chemistry in relation to his profession, he took an interest in all sciences and discoveries, in his favourite science affected. He was one of the first to analyse the so-called Coprolites, and to discover the large quantity of phosphate of lime they contained. This he did in a paper published in the third volume of the 'Transactions' of the Geological Society. The paper was entitled 'On the Analysis of the Fossil faces of Ichthyosaurus and other Animals.' Dr. Prout was a Fellow of the Royal Society, and many other learned societies. He died at his house in Sackville-street, London, in 1829, at the age of sixty-four, in the fourth year of his life. He was a man of exceedingly reticent habits, and greatly respected by those who knew him intimately.
classes, their social circumstances, and their physical condition generally, far more unfavorable than they had previously been. Many of these propositions are supported by facts that appeared in their Report produced a strong impression on the public mind, already startled by the dread march of Cholera. When the Poor Law Amendment Act was brought into operation, the London Association for the prevention of the want of Medical Aid in Unions was formed, and published in the Annual Reports of the Commissioners, deepened and strengthened this impression, and led to a desire for a fuller and more specific investigation. Such an investigation the Poor Law Board determined to undertake, and, in the first instance, confined itself to the metropolis, being entrusted to Dr. Arnott, Dr. Kay, and Dr. Southwood Smith. The Reports of these gentlemen, which were printed in the Fourth and Fifth Annual Reports of the Poor Law Commissioners, disclosed an appalling extent of vice, vice, and social corruption, and led to the dire result of the neglect of the plainest and most rudimentary sanitary laws. The statements of the Commissioners, as might be expected, excited a very painful sensation, and the then Bishop of London (Dr. Blomfield) moved in the House of Lords (Aug. 19, 1839) an address to her Majesty, praying that a further inquiry might be made as to the disease and destitution prevalent among the labouring classes in certain districts of the metropolis; how far the same prevailed in other districts of England and Scotland; and what measures would be necessary for the removal of those evils. By a subsequent vote the inquiry was extended to Scotland.

The Inquiry was placed in the hands of the Poor Law Commissioners, who, having been organised by the Board, the local investigations were made, not only through the medium of the Assistant Poor Law Commissioners, and the medical officers of Unions, but much assistance was derived from the medical profession generally, the clergy, and others; and a large body of information was brought together of a kind similar to that previously obtained by the Metropolitan Commission. This information was arranged and digested by Mr. Edwin Chadwick, then Secretary to the Poor Law Board. His Report on the General Sanitary Condition of the Labouring Classes, published in 1842, presented not merely the fullest and most complete view that had been brought before the public eye of the physical and social condition of the labouring classes throughout the country, the causes of the prevalence of endemic and epidemic diseases, and the clearest and most comprehensive suggestions for remedying the evils shown to be so widely prevalent, but from it may be dated the origin of those important measures of sanitary reform which we shall presently have to notice. It contained the outlines of the system which were in fact here sketched. We must not, however, omit to mention, in noticing these pioneers of sanitary improvement, the very important statistical researches of Mr. J. E. Hawkesworth, which were published and relied on simultaneously with the inquiries just described, which have been continued to the present day, and which have served, and still serve, to give precision and specific directions to the observations of other inquirers.

In the Report of Mr. Chadwick, it was shown that whilst in each there were local and peculiar causes of mischief, in all the great towns there were common sources of danger and disease, in the existence of close and confined localities where the over-crowded houses were constructed, undrained, or insufficiently drained, damp, dirty, and ill-ventilated, and surrounded with numerous sources of malaria: the seats of almost constant fever and sickness, and that, as a consequence of their enfeebled physical condition, the inhabitants were the earliest sufferers in times of epidemic disease. So evident indeed was the influence of locality on disease, that Mr. Chadwick was able to show that, whilst the mean rate of mortality in a town would be represented as 1 in 22 annually of the whole population, in one district the mortality might be as in St. George's, Hanover Square, London, only 1 in 57; in another district of the same town (Whitechapel) as much as 1 in 28 annually; or to take another illustration, that whilst in one street and amongst a particular class of tradesmen the average duration of life was about 50 years in another street of the same town, amongst a different class, the average duration of life is only fifteen years. But it was further shown, that although almost necessarily owing to their rapid increase and the prevalence of disease—sanitary considerations having been entirely overlooked—the effects of particularised were, so to speak, intensified in towns like London, with its miserable purblind inhabited by thousands of wretched wanderers and outcasts; Liverpool, with its 8000 damp cellars, and its 8000 close courts, each with an opening communicating with a lane, were so filled with such persons that the stench from their houses was so disgusting, that they had to be air'd nightly by means of the mire, and the constant fall of visitation of fever, cholera, and similar diseases all were insufficiently drained and ill supplied with water; all had their St. Giles's, their pestiferous lodging-houses, their fever-nests, their labourers' dwellings, where comfort and cleanliness were impracticable, and where sickness and death were the constant sequel. At these statements in the mass and in detail, it was impossible not to agree with the report that this was a state of things disgraceful to the intelligence and civilisation of the country, and that immediate and comprehensive sanitary reform was necessary. Mr. Chadwick forcibly observed, it was incontestible, that the facts deduced, that "noxious physical agencies depress the health and bodily condition of the population, and act as obstacles to education and to moral culture; that in abridging the duration of the adult life of the working classes, they check the growth of productive skill, and abridge the amount of social experience and steady moral habits in the community; that they substitute for a population that accumulates and preserves itself, a population, which, being continually destroyed, is continually replaced, the young, inexperienced, ignorant, credulous, irritable, passionate, and dangerous, having a perpetual tendency to moral as well as physical deterioration." And happily he was also able to observe that the report had been another great warning to the general public, to the effect that mere sanitary measures, not only might the more palatable and offensive evils be removed, but that "it is probable that the full insurable period of life indicated by the Swedish tables, that is, an increase of thirteen years at least, may be extended to the whole of the working classes, the measures of the sanitary reform, if fairly carried out."

The remedial measures pointed out as of primary importance were the providing of a sufficient supply of good water to every house, an ample supply being at the same time furnished for the cleansing of the streets, for sewerage, for the collection and conveyance of sewage and offal, for the drainage by the adaptation of drains and public sewers, and the construction of water-closets in houses of every class; the preservation of the natural streams flowing near towns from the pollutions caused by the influx of the contents of the public sewers, and the employment of the sewage for agricultural purposes; the adoption of measures for securing a better class of labourers' dwellings; the licensing of common lodging-houses, and placing them under strict control; the adoption of measures to restrain the pollution of the air by the fumes of manufactories, &c., and the appointment of district medical officers, "independent of private practice, and with the securities of special qualifications and responsibilities, to initiate sanitary measures, to adopt all known means of improving the condition of the labouring classes, and to clean forward the inroads of mortality.

These suggestions have since for the most part been embodied in the Health of Towns Act, and other sanitary measures passed by the Legislature. The subject of intra-mural interment was also considered by Mr. Chadwick in a special report in the following year.

But, searching as had been the investigation, and undeniable as appeared to be the facts, and urgent as seemed the necessity for combating the wide-spread evil, so large an aggregate expenditure was requisite for executing the works, and so extensively would the suggested administrative organisation interfere with existing interests, and, as some might conceive, with local management and individual freedom of action, that it seemed to be necessary to submit the question to any legislative enactment without instituting still further and more formal inquiries. A Royal Commission, consisting of eminent members of both houses of parliament, civil engineers, and scientific men, was accordingly appointed, in 1844, for the purpose of inquiring into the state of the sanitary questions connected with the public health. The evidence collected entirely corroborated that of the former commissions,
and the conclusions arrived at were to effect the same as those of Mr. Chadwick. In their Reports, dated June 1844 and February 1846, they showed the great questions bearing on the sanitary regulation of populous places—sewerage, drainage, paving, cleaning, removal of nuisances, consumption of smoke, supply of water, public baths and wash-houses, ventilation, streets, buildings and streets, and interment in towns—were found, almost univer-
sally, all of them in an extremely unsatisfactory condition; and having examined the existing law with regard to those subjects, expressed their opinion that it would "be necessary to modify or even to sweep aside the aid of our legislators for further enactments, before the improvements so much desired can be fully accomplished."

Thus fortified, the ministers framed a bill embodying many of the recommendations of the Health of Towns' Commis-
sions. This bill was introduced by Lord Lincoln, then Chief Commissioner of Woods and Forests; but it was explained that it was introduced mainly with a view that its provisions might be carefully considered during the recess, and no attempt was made to carry it fur-
ther. A change of ministry interfered with its progress in the next session. In 1847, however, Lord Morpeth, who had succeeded Lord Lincoln as Commissioner of Woods and Forests, introduced an amended bill, but though, in conse-
quence of the recess, and the general measures of the ministry of Lord Grey, the bill was not read a second time; it was ob-
jected to withdraw the clause which included the metropolis within its provisions, he failed to carry the mea-
sure that session. In the next session it was again brought forward, and, its urgency having been placed on the attention of the country, the clause in question was removed from the throne, it was carried by both houses; and, on the 31st of August, 1848, it re-
ceived the Royal Assent.

The object of the Public Health Act of 1848, as stated in its preamble, is to make "further and more effectual provision for improving the sanitary condition of towns and populous places in England and Wales" [the metropolis being excepted from its operations]; for which purpose it is declared to be "expedient that the supply of water to such towns and places, and the removal of the nuisances and the cleansing thereof, should, as far as practicable, be placed under one and the same local management and control, subject to the general supervision of a 'General Board of Health,' consist-
ing of the First Commissioner of Woods and Forests for the time being, and two commissioners appointed by royal warrant, to whom the superintendence and execution of the act are to be entrusted. The Act is of great length, containing no fewer than 103 clauses; but as it is an Act of the greatest magnitude, and therefore has had a long and laborious course, it is advisable, concisely, to state, how, in the event of any alteration of it, the sanitary condition of the towns and populous places in England and Wales will be affected.

As the Act comes to be applied without a public preliminary inquiry, which the General Board had the power to order on the petition of one-tenth of the ratepayers of any such place as came within the cognisance of the Act, or where the average deaths for seven years should appear, from the Registrar-General's Returns, to be above £3 in a thousand. In either of these cases a superintending inspector may be sent—14 days' notice by advertisement, &c., having been given in such locality—to examine personally and by witnesses into the sewerage, drainage, water supply, burial grounds, &c., and report thereon to the Board. If the General Board now deem it expedient to apply the Act, the Queen may, if there be no local act, by an Order in Council order the Act, or any part of it, to be carried into effect; if a local act, the Privy Council may make a provisional order for its application, such provisional order to be afterwards sanctioned by parliament. In every such case the carrying out the pro-
visions of the Act is entrusted to the Local Board of Health created by it, who are to appoint a surveyor, an inspector of nuisances, and a medical officer, with other necessary officers. In a corporate town the members of the Corporation are to constitute the Local Board of Health, in other places the members are to be appointed by the Board; in all cases, the entire sanitary government is vested solely in the Local Board of Health.

As to the powers of the Local Board,—it is imperative on them to provide for the effective drainage of their locality, by the proper construction of sewers and drains for sewers and for house drainage by causing sufficient drains to be con-
structed in all new houses, or in any house which may be without a proper drain communicating with a main sewer; they may also cause due provision to be made as to privies, offices, &c., and public conveniences in houses and buildings, and when properly times causes a thorough surface cleansing and watering of all streets; provide for the storing and taking away of dust, &c.; and cause nuisances to be removed, and filthy and un-
wholesome buildings, &c., to be purified and whitewashed. The Board may also, as a last resort, provide for the accumulation of pure water, for the purposes of the Act; but not construct new water-works if a Company is able and willing to pro-
vide a sufficient supply on reasonable terms; and in any case the Board must obtain the consent of the Local Board before contracting to purchase old, or to construct new water-works or gas-works. The office of surveyor of high-
ways is vested in the local board, who must see that the highways are properly paved and lighted; that new streets and roads are formed in accordance with the terms of the acts of parliament. The local board may also, subject to the control of the General Board, close any unlawful burial ground, and provide general cemeteries for persons of all religious denominations. Also, subject to like control, form, or contribute to the form, of pub!

The intention of the Act in respect of local management and central control has been, in short, to cast upon the inhab-

...
door opened wide for a return to the old apathy, mismanage-
ments, negligence, to local inefficiency, want, perulation, and
favouritism. The "general medical functions of the
Board of Health" are to be dealt with in a separate
section, "they being distinctly central and govern-
mental functions.

Since the passing of the Health of Towns Act, appli-
cation has been made to the metropolis for a "preliminary
inquiry" into their sanitary condition by the inspectors
of the General Board. How much such an act was needed—
how little had been accomplished by mere local effort, not-
withstanding the ample provisions of the Public Health
Acts, the Law Board Reports, the Reports of the Royal
Commission, the Returns of the Registrar-General, and
the teaching of cholera and fever—has been shown in the
most convincing manner by these "preliminary inquiries," ranging in time from the past
year to the year 1858. Building does not exist in almost
every district of England and Wales. We had
selected from recent reports of the superintending inspectors
a few special instances as illustrating the present state of
too many "towns and populous places," not yet brought
under the cognisance of the Health of Towns Act, including
sea-side and inland watering-places and resorts of invalids;
mixing and manufacturing towns and villages in the north of
England and Wales; rural towns of the eastern, southern, and
western counties; but others have told, they, after all, but tell, with variations, the same sickening
story of wretched quarters—often in close, though scarcely
suggested proximity with the open and airy dwellings of
the affluent—dark, close, crowded, loathsome, undrained, and
wretched, carrying the stench of impure
supply of water, and, what is to be obtained, hard
and impure; many of the streets where fever is never absent;
lodging-houses where men, women, and children are huddled
together in close, filthy, over-crowded, and
abominations, in the very midst of the most
densely populated localities; burial grounds, surcharged, and
the like—seemingly in defiance of sanitary
principles; the most obvious to the commonest understanding,
but, in fact, the most neglected through the
part of the influential classes that such things exist, and
the absence of any responsible officer whose duty it is to make
himself acquainted with their existence and to apply
the remedy. In short, it may be said, that the
population of these towns and populous places, where every one has been left to
do as he likes with himself and his own, to illustrate the
evil consequences of neglect of sanitary regulations.
For the miserable loss of health and life among our soldiers at Scutari
and in the Crimea, where—as military authorities themselves
admit—the arms of the enemy slew but few in comparison
with the ravages of disease, and the recent astounding disclosures
respecting our barracks at home, more than sufficiently prove all the evils of our local
advocate of sanitary reform has
sustained the necessity for correcting these impure waters,
fulness, and authoritative control. Happily, too, in the
same quarter we have a striking illustration of the benefit of
sanitary regulations. For, both in the hospitals of the Bosphorus
and the Crimea, the rigorous and stringent
and precautionary measures of the Sanitary Commissioners,
sent out from England in January 1856, have been brought
into operation, than the number of deaths, and the amount
and violence of the sickness, were abated; and ultimately the
very remarkable fact was established, that notwithstanding
all the hardships, exposure, and fatigue attendant on a state
of warfare, the actual mortality was lower than in the barr
racks in England—a fact which renders the more strange and
incredible, from the number of those barracks which those barracks should afterwards have suffered to continue.

Up to the end of 1857 about 230 places had been brought
under the operation of the Health of Towns Act. In a fair proportion of these places sanitary works of an efficient
order have been executed. The sanitary works have of course been chiefly those of drainage and water supply, and in both these matters some of the works have been on a
scale of considerable magnitude. By the earthenware pipe drainage being used, and the rainfall
place or peculiarity of site, the local boards have in most
instances been enabled to effect thorough drainage with compara
tive readiness and economy. The utilization of the sea
water has not however yet been brought into general suc
cessful operation. And it appears as if those places have made that the successful drainage of the town has resulted in the pollution of the natural streams—a necessary con
sequence of such works where the outfall is into the water
courses, and no sufficient measures are taken for the utilisation of the sewage, and the purification of the waste water. The means adopted for obtaining and distributing an ample supply of pure water have proved generally satisfactory, and now in numerous places where only a scanty supply of hard and impure water was obtained, has been abun
dantly provided with water of excellent quality. And wherever these sanitary works have been judiciously
planned and properly carried out, there has followed a marked
improvement in the general health and comfort, while the
number of deaths from cholera and fever has been less
than in other places, and in some it is even stated that
the most part far less burdensome than where inferior works have been executed under the old local improvement acts.

To the improved health and decreased mortality in several
of these towns the Registrar-General has in his Reports
shown that these improvements have been brought about by
the Local Boards of Health themselves, thus the
Macclesfield Board say, in a Report addressed to the Town
Council, that the death tables of the borough show that the
mortality, which before the application of the Act averaged
33 in a thousand, has during the three years of the operation
of the Board been reduced to 26 in a thousand; that infantile
mortality—always a trustworthy test of sanitary condition—
has been reduced 15 per cent.; that in the "old towns of,
thousands and thousands of people are now enjoying a
mean duration of life in the towns has been lengthened. The
application of sanitary measures has not however been con
fined to the towns under the Health of Towns Act.
Several large towns which have been brought under the
Local Acts at Liverpool and Manchester, for instance, and
very costly works have been constructed for bringing to these places a supply of pure water from a considerable
distance; and at Glasgow a similar supply has been obtained, at
a great cost, from the Cartage-burnet river.

We stated that the metropolis was exempted from the
operations of the Health of Towns Act. Several Acts were
indeed passed to meet particular evils, but notwithstanding
that the necessity for stricter sanitary supervision was ob
erved, the Metropolitan Water Board had not been
incorporated and the parish vestries against centralisation
of authority, that it was not till 1856 that a measure intended
to secure to London the same sanitary improvements as the
Health of Towns Act offered to the rest of the country
came law. The Metropolis Local Management Act is how-
aver a far longer and more cumbersome measure than the former (it contains 251 clauses and several schedules), and its machinery is larger and more complex; it must suffice there
fore to say that its objects and scope are very similar, how-
ever different in some respects are its modes of operation.
The executive body created by it is entitled the 'Metropol
itan Board of Works,' and consists of a president, with a
council of 9 aldermen and 24 commissioners, each of whom is
called"metropolitan commissioner," who sits in the vestries of the metropolitan parishes, and the common
council of the city. To this board was transferred the
powers of the former Commissioners of Sewers, the super
vision of all metropolitan buildings, the laying out of new streets, etc., and the compulsory purchase of
land. But within certain limits a controlling power was entrusted
to the Chief Commissioner of Works and Buildings.
The great work which was cast upon the new board was the
purification of the Thames, by the interception of the sewage
of London, which the board was ordered by parliament to
accomplish. In this it has however made little progress, not
having been able to satisfy the government (or the public) of the
sufficiency of its plans. In other great matters, as the
removal of the dockyards to Woolwich, and the laying out of
the docklands, and the remodelling of the parks, &c., it has also been content to discuss and to plan.
In small matters its officers have found sufficient occupation.
But on the whole, as from its constitution might have been anticipated, it has hitherto proved rather a board of discus
sion than, as it claimed to be, a board of execution.
The Health of Towns Act, and special Acts similar to the
Metropolis Local Management Act, would pretty well suffice, if properly carried out, for the sanitary regulations of the
metropolis, and it may be said that the other towns of the
metropolis are hardly more than villages, and there are many towns in which such acts have no force, general
measures have been, and still continue to be, required to meet particular sanitary evils. We cannot enumerate all of these, but it may be convenient to mention the chief sanitary
laws of the metropolis. The most important of these is the
scheme for the establishment of Baths and Washhouses, passed
in 1846, is noticed under another head, [BATHS AND WASH
HOUSES, S. 2]; and as the Towns Improvement Act of 1847,
which consolidates previous acts respecting paving, draining, cleansing, and improving towns, and contains many valuable new clauses, created new machinery for carrying its provisions into effect, and accomplished much less than its framers anticipated, we may pass at once to the measures passed subsequently to the passing of the Act of 1851.

The Nuisances Removal Act (1854) was intended to effect with respect to the removal of nuisances, and the enforcement of regulations for the prevention or mitigation of epidemic, endemic, or contagious diseases, the same end in places not within a town, as the Act of 1851 had in places within a town, would be accomplished under its powers. Like that Act this has been more than once amended. In 1849 the only sanitary enactment was an extension of the Metropolitan Act.

In 1850 was passed an important "Act to make better provision for the Interment of the Dead in and near the Metropolis." Recognising the great truth that all interment within the boundaries of a city is in opposition to sanitary principles, it provided that when the General Board of Health, who were appointed to carry into effect the provisions of the Act, should see fit, they might report to her Majesty that interment in any church, chapel, or burial ground, ought to be discontinued; whereupon the Privy Council was empowered to empower any body having charge of such a ground to continue therein after a certain fixed period. The Act also empowered the General Board to purchase existing, or to form new cemeteries at convenient distances from the metropolis, and to give a grant of land to any such body as it might think fit; but that this Act may be ascribed the abolition of intra-mural burial, and the construction of spacious and neat cemeteries on all sides, but at some distance from the metropolis, though the actual accomplishment of the object has been much hindered. By the Act of 1852 parishes or districts willing to construct new burial grounds were empowered to elect Burial Boards, to which were entrusted the construction and management of the burial grounds, subject to the approval of the Secretary of State. An Act of 1853 extended the Act of 1852, and the Act of 1852 was extended by an Act of the same year amendment the Burial Act of 1852, and extending its provisions to any city or town in England. Another amending Act was passed in 1857.

In 1862 the object was to amend the Act bearing on the health of young persons and females working in factories,—by which, as amended in 1853, the period of labour of such persons was restricted between the hours of six in the morning and six in the evening, or during winter from seven to seven, and on Sundays from noon to six; by which the Act gives the right to the Board of Health to enquire into the state of the factories, and provides for the employment of agents to make such inquiries. Under these powers the inspectors have been extremely useful, and have enabled the Board to enforce the law in many cases in which the employers have been most obdurate.

A much needed Act was passed in 1851 for the well-ordering of Common Lodging Houses; and in the same session one for encouraging the establishment of such houses of a superior kind. Those Acts did not apply to the Metropolis, and the works of the Board were much impeded by the density of population. By the Act of 1852 the provisions of the Act of 1853 were extended to all common lodging-houses, by an additional Act in 1853. How much such a measure was required, what has been already said will have sufﬁced to show; but the power of the Board is still limited, and by the same Act is still retained in the hands of the Local Government Boards, who are hardly ever active. In Hucknall, Nottinghamshire, Mr. Lee found the common lodging-houses "hot-beds of disease and vice. . . . . . Men, women and children, and frequently dogs, form a promiscuous herd, all sleeping in the same room, from which every breath of pure air is excluded. . . . Most of the lodgers sleep in a state of absolute nudity, and decency, with the greater portion of them, has long ceased to be thought of." In one house he found, in a single room, six beds, in which were two females, and seven in the same room, in which every breath of pure air is excluded. . . . Most of the lodgers sleep in a state of absolute nudity, and decency, with the greater portion of them, has long ceased to be thought of. . . . In one house he found, in a single room, six beds, in which were two females, and seven in the same room, in which every breath of pure air is excluded. . . . Most of the lodgers sleep in a state of absolute nudity, and decency, with the greater portion of them, has long ceased to be thought of. . . . In one house he found, in a single room, six beds, in which were two females, and seven in the same room, in which every breath of pure air is excluded. . . . Most of the lodgers sleep in a state of absolute nudity, and decency, with the greater portion of them, has long ceased to be thought of.

In the case of the Londonнапример, the Board of Health has been enabled to extend its powers, and to secure the proper management of the establishments under its control, by the Act of 1856. This Act contains provisions for the prosecution of persons who are guilty of neglect or omission to carry out any order of the Board of Health, or to give the Board such information as it may require; for the punishment of any person for wilfully obstructing the exercise of any power under the Act; for the regulation of the conduct of persons, and for the prevention of disturbances, in the manufacture of gas, or its distillate streams below Teddington lock; are sufﬁciently referred to in the following article. [Public Improvements, Š. 2.]

In 1854 was enacted the Board of Health Reconstitution Act, and amendments of the Metropolitan Burial Act, and the Metropolitan Police Act of 1839; and in 1855 the Local Government Act of 1854 was altered and extended to all the counties, and certain amendments of the previous Act were passed. These Acts were all of extreme importance, and the last mentioned Act was especially so, as it afforded the first opportunity of extending the pow-

The Smithfield Market Removal Act of 1851; and the Metropolis Water Supply Act of 1852 (by which the water companies taking their supply from the Thames are, with the exception of the Chelsea Company, prohibited from taking any water at the point of junction of the Thames (or its orifices streams below Teddington lock), are sufﬁciently referred to in the following article. [Public Improvements, Š. 2.]

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Registrar-General in one of his valuable reports (1858), "there is room for immense improvements in the sanitary condition of the population." And we cannot perhaps better conclude a paper on the Public Health, in which the subjects have so often been dwelt on, than by quoting what he—speaking with the authority derived from a knowledge unrivalled in extent and accuracy of the sanitary state of the whole of England and Wales—"whilst asserting his belief that the mortality of England and Wales is being reduced, and that it is a national duty to use every effort to diminish it, the time has not yet arrived when the health of the metropolis, and many other public buildings of considerable size and completeness, as well as many great commercial works, have been constructed; and street architecture has assumed an entirely new character and consequence. And in all these matters the larger are the number of dwellings, the more likely are they to enter into partnership with the metropolis. It would indeed be severely an exaggeration to assert that more and greater public works have been constructed, and more public improvements have been effected during the last twenty years, than during any previous half-century.

New Streets.—The new streets in the metropolis have added much to the public convenience, and greatly improved the appearance of certain quarters; but much more might have been equally accomplished had the improvements been carried out as part of a well-considered general plan, instead of being disconnected and local experiments. In the City, however, something like a general plan has been observed. The erection of the new London Bridge led to the formation of 20 acres of new houses, which showed the necessity of still greater changes; and the civic authorities have since kept that necessity steadily in view. The erection of the new Royal Exchange afforded an opportunity for opening the area surrounding that building. By the removal of the Corn Exchange, the Yards, and the City Hall, to St. Paul's, an excellent street—New Cannon Street—has been formed from King William Street to the east side of St. Paul's Chu-chyrd. This street has been for the most part lined with large and lofty warehouses, many of them of considerable height, and has had a remarkable effect on the character of the City, and is a monument to the policy of the corporation. But the new line of thoroughfare, i.e., Gresham Street, extending from Lothbury to the Post Office, has been formed as a continuation of the same character of acceess, and has been formed for traffic as from its width and position it ought to be, it will be necessary to make very extensive alterations in the area surrounding St. Paul's Cathedral—and such alterations are equally desirable for the architectural effect of that edifice.

Another, though less important new line of thoroughfare, is Gresham Street, extending from Lothbury to the Post Office, and as a street it has been formed for traffic as from its width and position it ought to be, it will be necessary to make very extensive alterations in the area surrounding St. Paul's Cathedral—and such alterations are equally desirable for the architectural effect of that edifice.

Beyond the limits of the 'City,' the first place among the metropolis of London must be assigned to the new thoroughfares which connect Holborn with Oxford Street by a straight and wide road, which passes to the north of the old mean and circuitous way by St. Giles' Church. On the north side of New Oxford Street a few good houses have been built, but much less has been done for the architectural aspect of the street than could have been wished. In the same vicinity Endell Street has opened a way from Long Acre to Bloomsbury, and thus formed a tolerably broad thoroughfare; and, though somewhat awkward and indirect thoroughfare from the Strand to Old Compton Street, the only thoroughfare which connects Holborn with Oxford Street by a straight and wide road, which passes to the north of the old mean and circuitous way by St. Giles' Church. On the north side of New Oxford Street a few good houses have been built, but much less has been done for the architectural aspect of the street than could have been wished. In the same vicinity Endell Street has opened a way from Long Acre to Bloomsbury, and thus formed a tolerably broad thoroughfare; and, though somewhat awkward and indirect thoroughfare from the Strand to Old Compton Street, the only thoroughfare which connects Holborn with Oxford Street by a straight and wide road, which passes to the north of the old mean and circuitous way by St. Giles' Church. On the north side of New Oxford Street a few good houses have been built, but much less has been done for the architectural aspect of the street than could have been wished. In the same vicinity Endell Street has opened a way from Long Acre to Bloomsbury, and thus formed a tolerably broad thoroughfare; and, though somewhat awkward and indirect thoroughfare from the Strand to Old Compton Street, the only thoroughfare which connects Holborn with Oxford Street by a straight and wide road, which passes to the north of the old mean and circuitous way by St. Giles' Church. On the north side of New Oxford Street a few good houses have been built, but much less has been done for the architectural aspect of the street than could have been wished. In the same vicinity Endell Street has opened a way from Long Acre to Bloomsbury, and thus formed a tolerably broad thoroughfare; and, though somewhat awkward and indirect thoroughfare from the Strand to Old Compton Street, the only thoroughfare which connects Holborn with Oxford Street by a straight and wide road, which passes to the north of the old mean and circuitous way by St. Giles' Church. On the north side of New Oxford Street a few good houses have been built, but much less has been done for the architectural aspect of the street than could have been wished. In the same vicinity Endell Street has opened a way from Long Acre to Bloomsbury, and thus formed a tolerably broad thoroughfare; and, though somewhat awkward and indirect thoroughfare from the Strand to Old Compton Street, the only thoroughfare which connects Holborn with Oxford Street by a straight and wide road, which passes to the north of the old mean and circuitous way by St. Giles' Church. On the north side of New Oxford Street a few good houses have been built, but much less has been done for the architectural aspect of the street than could have been wished. In the same vicinity Endell Street has opened a way from Long Acre to Bloomsbury, and thus formed a tolerably broad thoroughfare; and, though somewhat awkward and indirect thoroughfare from the Strand to Old Compton Street, the only thoroughfare which connects Holborn with Oxford Street by a straight and wide road, which passes to the north of the old mean and circuitous way by St. Giles' Church. On the north side of New Oxford Street a few good houses have been built, but much less has been done for the architectural aspect of the street than could have been wished.
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High Street (opposite Leman Street) to Spitalfields Church, whence it is continued by New Commercial Street to Shore-
ditch, near the terminus of the Eastern Counties Railway; thence, with certain alterations, to Rotherhithe, opened a direct thoroughfare from the London Docks to Shoreditch. A new line of street on the Surrey side of the water, from High Street Southwark to the Waterloo Road, and others on the Middlesex side, have been authorized by the Metropolitan Board of Works, but the execution of neither of them has been commenced.

**Parks.**—The oldest of the new parks is **Victoria Park,** on the eastern side of London, which was commenced in 1833, and opened from this street, commencing westward from Bethnal Green to Hackney Wick, and is bounded on the south by Ducketts Canal. Victoria Park was laid out with more regard perhaps to convenience than to pic-
turesque effect, but it is yearly increasing in attractiveness as the trees with which it is supplied increase in size and vigour. A portion of this park has been appropriated as a free play-ground, and a free gymnasium has also been formed—both of which have proved, as well as the park itself, invaluable contributions to the pleasure of the poorer classes of the extreme east of London. **Battersea Park,** occupying the marshy tract on the right bank of the Thames, of which the notorious Red House may be taken as the centre, was commenced, after much delay, in 1854, and very much prejudiced by the invasion of the pest. It has a more ornamental character than in Victoria Park, and alto-
gether it already wears much more the aspect of a pleasure-
ground. Its area is about equal to that of Kensington Gardens. It contains a large and separate park, the near part as a sort of garden, and well stocked with shrubs and flowers; a noble river esplan-
ade, 120 feet wide, extends the whole length of the park; and the park itself is well provided with broad walks and canals. To the latter approaches. A handsome suspension-bridge gives the inhabitants of Chelsea ready access to the park. As in Victoria Park, it is proposed to build villa residences along its borders. Like Victoria Park, it has provided an agree-
able and much-needed place of open-air recreation to a very considerable extent, occupying about 233,000L. Kensington Common, which had been per-
mitted to fall into a very disreputable state, has by govern-
ment assistance been enclosed and planted. It has been somewhat absurdly dignified with the title of Kensington Park, but, though it has no claim to such a designation, it forms an agreeable pleasure-ground. The model cottages erected by Prince Albert near the site of the Exhibition of 1851, have been re-erected as an entrance lodge to Kenning-
ton Park, near the place where the residence of the Prince of Wales is situated. Mr. J. C. Loudon, of Finsbury Park, but its construction has not yet been com-
enced (May, 1855). Another park has been projected for the use of the inhabitants of the south-eastern extremity of the metropolis, and recently approved by the commissioners of the city of London, to which is added the spacious grounds of Rotherhithe and Deptford; but it is at present only a project. In the old parks many improvements have been made by better draining, the formation of new walks, the erection of new lodges and gates, the addition of numerous seats, &c. The most extensive improvements have been perhaps effected in St. James's Park; where a new broad entrance has been made between Marlborough House and St. James's Palace, and in a line with it a suspension-bridge for foot passengers (by no means a favourable specimen of that kind of bridge, however) has been constructed. New water, new approaches being at the same time formed on the other side. The lake has also been cleared, and a new bottom constructed of thick concrete, thereby at once increasing the accommodation for skaters, and affording safety for skaters.

**Architecture.**—The most important building erected in London during the period of which we are treating—the most important indeed which has been erected in London since the commencement of this street—has been commenced by the celebrated civil engineer. On the completion of the river wall, it was instructed to carry out his design. The first portion of the works undertaken was the river wall, which was con-
structed by means of a caffer dam, under the joint super-
vision of Mr. P. and Mr. C. A. Barry, and the celebrated civil engineer. On the completion of the river wall, the foundations of the building having been simultaneously proceeded with, the first stone of the building was laid, without any ceremony, by the architect's wife, April 27, 1840. The first stone was however not the last, many interruptions of the ceremonies being necessitated by the appointment and proceedings of committees of the two Houses of Par-
lament, royal and parliamentary commissions, commissioners of works, ventilation directors, and other principal and sub-
ordinate authorities, and the alterations and changes which at times made in the plans of the architect and of each other. The House of Peers, with its libraries and offices, was opened on the 16th of April 1847. The House of Commons, with its offices, was opened on the 23rd of February 1854; and on the same day all the public entrances, the great Central Hall, and St. Stephen's Hall, were thrown open—
all, like the laying of the first stone, being done without any public ceremony: but about the same time the architect was dead. On the 3rd of April, 1857, at the age of Mr. E. M. Barry, (in a paper descriptive of the new palace, read before the Royal Institute of British Architects, Feb. 1, 1858, and of which, as it may be regarded as semi-official, we have made use,) most of the remaining portions of the edifices have been completed; and to the last little remains to be done. The Speaker's House is all but
finished, and will be occupied after Easter. The residences in the south wing will be completed in a few months, and before long the main towers, the royal gallery, and the great entrance portico will be ready for occupation, so that by the close of the year the present works at the new palace will be brought to a close. Much has been said," continues Mr. Barry, "about the time the edifice has taken to construct, ... but I must say that, from my own observation, it is a work for which the public of the country has never been interrupted for an hour, but has always possessed temporary accommodation on the site, which has only been handed over permanent to the builders—architects, at any rate, will not think the time that has elapsed between the laying of the first stone in 1840, and the completion of the building in 1858, has not something to show in the work that has been done." In this observation we quite concur. The public may be to complain of, the time that has been spent on the building, the extent, character, and complexity of the works, even had there been no extraneous hindrances, would have amply explained and justified; indeed it is probable that all the time required for the completion of any very of construction, and richness and extent of ornamentation
has ever been erected in anything like so short a time.

The style of architecture adopted for the new palace is that commonly known as the perpendicular Gothic of the reign of Henry VII., but that style is chiefly known from the ecclesiastical and collegiate buildings erected in or about the reign of that monarch, whereas the architect himself says of the new palace, "it has been my aim to avoid the ecclesiastical, collegiate, castellated, and domestic style, and to select that which I consider better suited to the peculiar appropration of the buildings." The east, or river front, which stretches along the Thames a length of upwards of 900 feet, and contains the libraries and committee-rooms, was the first part of the palace ready for occupation. Of this face the central portion is a story higher than the rest, and two towers with high roofs flank each extremity. Except that the end towers project somewhat, the river front is not only uniform in character but unbroken by receding parts, "reliance being placed," says Mr. Barry, "on bringing up the sky-line to avoid monotony." Throughout this front, as indeed with scarcely an exception throughout the building, the wall-surface is covered with paneling and profusely decorated with colonnettes. The kind of columns which the river front was intended as a record in stone of English history. There are thirty-five bays exclusive of the two oriel bays; each of these thirty-five bays contains the arms of an English sovereign, beginning with William I., in the following order: 4 A 2
Arms of England, with the motto, "Victoria Regina feliciter reignas." Examine closely the effect is extremely rich, though somewhat monotonous; but the enrichment is almost entirely lost when the façade is looked at from a sufficient distance to be viewed as a whole, and this is almost necessarily the case if the House is to have any effect upon the distant or invigorated by the play of light and shadow. It is impossible not to regret that, by the adoption of bold breaks in the outline, a mere picturesque combination has not been presented to the river.

The interior is much more varied, and promises to be much more satisfactory. But for its full effect it must wait for the removal of the present most unsightly law-courts, and the completion of the architect's design by the erection of the Tower, with fan-lighted turrets at the corner of Palace Yard. The great feature of this front is the Victoria Tower, which occupies the southern extremity of the building. This magnificent structure is 70 feet square, and rises to an altitude of 545 feet to the top of the turrets, being the loftiest tower in existence.

It forms the royal entrance to the palace, the basement being a noble arch 60 feet high and 22 feet wide, under which the royal carriage passes. Triple windows of very rich and beautiful design occupy the chief wall-space of the two principal stories. The entire unpierced wall-surface of this vast tower is covered with panelling, with canopied niches containing statues of the monarchs of England, and with the arms and supporters of the different sovereigns. A pierced parapet, extending from the wall to the turrets, without the angles from the height of 55 feet above the cornice.

From the summit of the roof will float on state occasions the royal standard; and the scale on which the whole is conceived is truly magnificent. On the front of the tower the flags staff will be "of rolled sheet iron firmly bolted together, 110 feet long, 3 feet in diameter at the base, and weighing between 16 and 18 tons," while the flag, which will be 60 feet long and 40 feet wide, will have to be hoisted to its place by machinery. The Victoria Tower may fairly be said to have the finest tower of medieval date for beauty and grandeur as well as for mere size. Two other towers form equally important features in the design—the Central Tower, less lofty in itself than the Victoria Tower, but endowed with a light and elegant style, which rises to a height of upwards of 300 feet, in many points of view glooming admirably with the main features of the palace; and the Clock Tower at the north-western angle, by Bridge-street, which though little lower than the Victoria Tower, is much less ornate, being the architect's object "in designing this tower to make the clock the predominant feature: all else was to be pedestal or roof."

In the interior, the chief interest of course centres on the "Hall of Parliament." These are placed pretty nearly in the midst of the building. In the central part of the Central Hall, a noble octagonal chamber covered by a stone groined roof 70 feet in span, which forms the principal floor of the Central Hall a central arch, richly carved, leads to the House of Peers, and a similar archway in the lobby on the north to the House of Commons. The House of Peers, as the chamber in which the sovereign delivers the royal speech in the presence of the members of both houses of parliament, as well as the members of the diplomatic corps and of the royal household, is the larger and more splendidly fitted apartment. But knowing its purpose, the first emotion of the stranger is usually surprise at its apparent simplicity; its proportions are—length 90 feet, breadth and height 70 feet; windows with six or eight lights, without stained glass, on the east, and the same number on the west side, and three compartments corresponding to them in shape, but filled with pan-tiles in fresco, at the south, or throne end, and three similarly sha-ed and gilt-dome compartments at the north, or bar end. The ceiling is flat, and divided by longitudinal and transverse beams into 18 compartments, which are subdivided into panels, and these, as well the wall-paintings are of a very simple and unembellished kind; indeed every portion of the wall-surface which is not occupied by statuary, is decorated with gilding or colour; and in respect of its decoration the room is probably the most elaborate and gorgeous which has been constructed since the decline of magnificence in English architecture. The Victoria Tower is 63 feet long, 45 feet broad, and 44 feet to the centre of the present ceiling, the original ceiling being concealed by one of a different form, with a view to remedy certain acoustical defects. In character this apartment bears a general resem-

ance to the House of Lords, but it is much less ornate. Still more than that room, it wears a close and confined appearance. Indeed, though capacious enough for ordinary occasions, it is incapable of containing the entire body of members in their proper places, while the accommodation for the visitors of the House is correspondingly inadequate.

The House of Commons—the very heart and centre of legislation—is, in a legislative palace covering an area of some eight acres and costing upwards of two millions sterling, provided with a chamber no small to hold all the members; yet so ill-adapted for its object that the members can with difficulty hear each other speak, and the public reporters have constantly to note that "the hon. member was quite inaudible in the gallery." The room is however a very handsome one, though less handsome than before the alterations; and for its faulty form and insufficient size the architect is said to be not to blame, the shape and proportions having been imposed upon him by the instructions of his employers.

Connected with the houses are libraries for Lords and Commons, containing upwards of 40,000 volumes; a committee rooms (admirably adapted for their purpose), refreshment rooms, &c.; and it may be mentioned as showing the singular completeness of arrangement which modern appliances permit, that all the windows have been arranged to be openable, being either fixed, with an air-current connected with a galvanic battery, so that the principal doorkeeper is enabled to make contact and ring all the bells at once, by pressing his hand on a button attached to the arm of a chair; and thus announce to the committee of some thirty members the admission of the to the House of Commons. A royal robing room of singular magnificence has been provided by the state entrance, and from it her Majesty passes through the Royal Gallery—another stately chamber—to the House of Lords. The Speaker's House, with its noble requisites of repose and state, is in a situation remote from the north end, and there are seventeen other official residences in the building.

Of the fine arts decorations which have been employed with a liberality unknown in any other English edifice we need content to borrow Mr. Barry's brief summary. "Frederick William Greatmore, M. A., by Messrs. Dyce, Cope, Macline, and Horsey. In the upper waiting hall, river front, by Messrs. Cope, Watts, Herbert, Horsey, Teniel, and Armitage. The Queen's robing room is now in the hands of Mr. Dyce; and the Peers' robing room is committed to Mr. Herbert. Mr. Ward is also engaged on a series of pictures for the corridors leading from the central hall, some of which have already been exhibited. Bronze statues have been placed in the niches of the House of Commons, by Messrs. Westmacott, Hervey, Dyce, Cope, and Mackenzie. Lord Woodington, Timbrell, Westmacott, Thornycroft, Thrupp, and Ritchie. Large white marble statues have also been erected in St. Stephen's Hall by Messrs. Foley, Bell, Marshall, Macdowell, Bally, and Carew; and a colossal marble group of her Majesty, by Gibson, in the prince's chamber; and Mr. Macline is engaged in painting the walls of the royal gallery. The whole of the statues and carving of the exterior, were executed by and under the superintendence of Mr. Thomas; and the lower floors of the principal buildings were finished by Mr. Welby Pugin, who may account for their excessively ecclesiastical and medieval character. "The total cost of the structure up to the 25th June, 1843, during which it has been in progress, is 1,768,076l. 4s. 6d." (Barry). The estimate, however, was for 1,378,000l, but it is very evident that the contract for the work, as it was executed, has been overhauled at a very considerable cost. Indeed, it is the interest of the public that the cost of this famous building should be considered, in order to satisfy themselves whether the enormous expenditure of millions of money is not, in some degree, an extravagance. A building of this description is naturally, and indeed too evident, an extravagance. A building of this description is naturally, and indeed too evident, a subject for a public inquiry; and the public are entitled to some assurance that the expenditure of millions of money has not been ill-spent. In mere extent the building is one of the most spasons of modern structures, covering
as it does an area of upwards of eight acres, and comprising eleven hundred apartments, above a hundred staircases (some of them of grand proportions), and more than two miles of corridors and passages; while as a specimen of constructive skill it is in the highest degree serviceable to the city and to the country. We have spoken freely of what we regard as its defects as a work of art, but we gladly record our conviction that, with all its defects, it is by far the most satisfactory, as well as the most useful, public building which has during the present or the last century been erected in England, and we believe it to be the finest which during the same period has been erected in any part of Europe.

A year or two back it appeared likely that another building on a similar scale to the new Palace of Westminster would be erected, in connexion with the new palace, and worthy of that edifice, the government, having in 1856 offered premiums to the amount of 5000£ to the architects of all nations, without re-tricting them as to style or cost, for a block-plan which should exhibit the best scheme for the concentration of the principal Government Offices, on a site lying between Whitehall and the New Palace at Westminster; and also designs for two buildings which Her Majesty's Government have determined to erect forthwith, as a necessary accommodation—one for the department of the Secretary of State for Foreign Affairs, the other for the Secretary of State for War." By the specified time 218 designs, embracing nearly 2000 drawings, were sent in, and 17 of them, by French and German as well as British architects, were selected. The block-plans proposed the most extensive, and in fact impracticable, re-arrangements of the site; the designs extremely magnificent but quite practicable buildings. On all hands it was agreed that the successful (and some of the unsuccessful) architects would have done well to listen to the practical knowledge, taste, and power; and that the competition was by far the most successful of any of recent years. In the House of Commons, however, there appeared a very natural disinclination to procure government for so large a cost, and costly a scheme, and without any public intimation, the Lords of the Treasury have cast aside the designs which they had induced the profession to prepare on the implied understanding that the work should be given to the successful competitors, and in place of the best proposal for the New Palace Hall as commission of public buildings, directed a non-competiting architect to design a new War Office on a more limited scale. Happily the transaction has been made public before the works have been actually commenced, and it is hardly conceivable that so great a scheme, and on such a site, can be permitted in now that its real character is understood. We therefore still have hope that whatever be the size and character of the buildings decided on, it will be referred to the premised competition of the British architects; and that their exertion will not be in vain, but that the government will permit their execution unless they be found unsuitable.

Next to the new palace at Westminster, the most important recent architectural work is the British Museum, of which the architect was Sir Robert Smirke, R.A. This building was begun in 1816, and the portico was completed in April 1847; it was not however opened throughout till 1851. "The building itself is the largest and most imposing example in the metropolis of the Grecian Ionic order, and the exterior has a certain monumental grandeur of character not inappropriate to its purpose. The interior few have been found to admire, either aesthetically or for its adaptation to the object for which it was designed. Even before it was completed it was found to be too confining a hall. The Great Court of the Houses of Parliament would, was designed, and it was pointed out that "the building is therefore fortunately wasted [by the great inner quadrangle] would have provided accommodation for the whole library, much superior to what is now proposed to afford it. A reading-room makes a very insufficient accommodation for books, communicating with each other, and lighted from the top: and the writer, Mr. Thomas Watts (now one of the superior officers of the Museum Library), goes on to show in detail that the existing accommodation has been misunderstood over Sir Robert Smirke's arrangements for the library and reading-room in the new building. But so much care and money had been expended on the architectural features of the great quadrangle that it might seem barbarous to propose filling up the space," Mr. Watts suggests as another, and perhaps more practicable plan, for obtaining the requisite additional room, to remove one side of Montague Street and Montague Place and make an extension of the building on the eastern side of the quadrangle, for which the necessary arrangements were to be executed as "occasion shall arise." This latter plan is the same in principle as that officially proposed to the Treasury on the part of the Museum Trustees in March 1858, but afterwards shelved, in consideration of the scheme for the New Palace of Commons for 1853 (except that Mr. Watts proposed to afford accommodation to the chief learned societies, on condition of their collections being opened to the Museum visitors); as the former is in principle the plan which was proposed on the rejection of the quadrangle extension in 1832, by Mr. W. H. Adam, as out in the new Reading Room. Some years later Mr. Hawkins of the antiquarian department in the British Museum proposed to erect a Board-room for the trustees, with study-rooms for the chief of departments, offices for clerks, &c., in the centre of the quadrangle, connecting them by corridors with the galleries of the building itself. Mr. Hocking, the first professional architect who appears to have taken up the subject—laid before the Commission of Inquiry into the constitution of the British Museum in 1848, and before the Museum Trustees in November 1849, a plan for erecting within the quadrangle a modified or somewhat reduced copy of the Pantheon at Rome, or in other words a cupola-covered rotunda, 120 feet in diameter, and 120 feet high, "to form a grand central space of important dimensions, in which the most important works of sculpture, and of such other objects proper to the purposes of the museum as most require that steady and equable light which is so well obtained from the eye of a cupola, could be placed, and thus the corridors and galleries," as his project did not meet the very many oppositions which it encountered. In 1849 Mr. Ferguson published a plan of a building within the quadrangle to be used as a reading room and for library purposes; and in 1853 Sir Charles Barry, by direction of the government, designed extensive alterations in the museum buildings, the chief feature of his design being a grand central hall within the inner quadrangle; but neither the voluntary, nor the commissioned design was destined to be carried into execution. Mr. Panini, now principal librarian, is the keeper of printed books at the museum, and has pressed on the trustees the necessity for providing additional room for the library, and laid before them a plan for obtaining a reading room and space for a large number of additional book-shelves within the quadrangle. In 1853 he proposed a more elaborate scheme, and this on the recommendation of the trustees, the government sanctioned. His plan, as put in working form by Mr. Sydney Smirke, was to erect within the inner quadrangle of the museum a Reading Room, circular in plan, covering the space from the first to the second floor; and on the first floor to be a large portion, if not the whole, of the printed books in galleries surrounding this great central apartment. This building, of which Mr. Sydney Smirke was the architect, was commenced in March 1854, and opened for the use of readers in May 1856. The building is a hall with a cupola, and a dome, 106 feet high, supporting being cast-iron piers, which carry girders of wrought iron strongly tied together, and these bear the dome. Between the main ribs are brick arches, but the frame-work is of iron, and hence an immense saving of space is effected. The Reading Room is 140 feet in diameter, and 106 feet high, exceeding therefore in diameter every other dome in Europe, except that of the Pantheon at Rome, which is 143 feet in diameter. But it differs from the Pantheon greatly in its proportions, being circular in the greatest diameter only; lighting, the Pantheon being entirely lighted by a circular opening at the top 28 feet in diameter, while the Reading Room has a similar light at the top 40 feet across, and 20 large windows in the half of the dome. Little is seen of the exterior, but the interior proportions are admirable, and in its height, and it answers the purpose for which it was erected admirably. It affords ample accommodation for 300 readers, for whose comfort and convenience abundant provision is made, of which the most remarkable is the pleasant light which fills the room, being 80,000 volumes: in the connected galleries and passages there is shelf-room for above a million volumes; and the whole arrangements afford an example of ingenious contrivance, as the building itself is a fine example of constructive science. It is at present the most public building in England, and in the inside within the last few years. The front of Nash's Palace is now concealed from the public eye by a new façade designed by Mr. Blore. In magnificence it is however greatly inferior to Nash's façade, but as that was in
most respects. The new front merely suggests the idea of a "terrace" of a rather superior class of private residences; and the original poverty of character has been increased owing to the circumstance that the stone selected was of so friable a nature that it could only be opened by a few small decays, and it afterwards covered with paint. The Marble Arch too, which, however inconsiderable with the palace, assisted in imparting to it a certain dignity of appearance, has been removed; and now forms the front of the old Clapham, Hyde Park Chapel, and is destined to meet the congestion of 19th century Gothic architects—forced thereto probably in many instances by their clerical employers—have sought chiefly to produce a building which should faithfully accord in general form, as well as in the window—inset, carvings, and other details, with the general style of the ancient successors,--"Decorated," or "Perpendicular" period; and it is not too much to say, with very little regard to the actual forms of worship and requirements of a church whose peculiar system of prayer and preaching was modelled on these of these styles of architecture had not merely ceased to exist as a vigorous living reality, but had perished with the season and the order of things to which it belonged. The merit of the majority of recent churches lies therefore in their picturesque quality, and some effort to produce an external form, and, in the best of them, in the sober "religions" splendour and impressiveness of their interior. There is abroad however a longing for a more perfect adaptation of ecclesiastical buildings to their actual use, a more thorough application of the discoveries of modern science, and especially of the leading men in this growing desire to cast off the merely servile adherence to mediæval precedent: the return, in a word, to the mediæval spirit—to earnestness and truth of purpose, and freedom of thought. And this has already affected much improvement, and will be still more evident if it can be shown that it is not only desirable, but also possible, were it even desirable, to particularise them, and it will be sufficient, in order to avoid invasions of distinctions, to refer as characteristic examples to the church of St. Stephen, Coleman, London churches of St. Stephen the Less, St. James, Bow, St. Etheldreda, St. John's Wood; and to the Baptist Chapel, Bloomsbury.

Of recently erected places of public entertainment, the principal is the new Opera House, Covent Garden. Covent Garden Theatre, built by Sir Robert Smirke in 1808-9, after competition with the Brunings, has been much improved by Mr. E. Barry with special reference to the production of modern English drama, and in 1846 the interior was entirely remodelled by Mr. Alban, to adapt it to the service of the Italian opera. But it met with the usual fate of theatres, being destroyed by fire March 6, 1866. For a time it seemed probable that it would not be rebuilt, but the obstacles were ultimately removed, and a new theatre is rapidly advancing towards completion, which has been designed by Mr. E. Barry with special reference to the exhibition of modern English drama, and in 1846 the interior was entirely remodelled by Mr. Alban, to adapt it to the service of the Italian opera. But it met with the usual fate of theatres, being destroyed by fire March 6, 1866. For a time it seemed probable that it would not be rebuilt, but the obstacles were ultimately removed, and a new theatre is rapidly advancing towards completion, which has been designed by Mr. E. Barry with special reference to the exhibition of modern English drama, and in 1846 the interior was entirely remodelled by Mr. Alban, to adapt it to the service of the Italian opera.
see a great deal too much flimsy 'compo' ornament—is a
Hexastyle Corinthian portico, 68 feet wide, and 80 feet high:
the columns being 3 feet 8 inches in diameter, and 37 feet high.
Flaxman's bassi-relievi, which were saved at the fire of the old theatre, have a place in the new portico, and its statues of tragedy and comedy in niches on either side of it. The basement or lower story of the portico is intended to serve as a carriage porch, while the principal story will serve as a promenade, the entrance to it being from the crush-room. It is announced that the house will be opened in the course of the present year, and that a temporary or 'floral arcade,' of glass and iron, 210 feet long, 80 feet wide, and 60 feet high, is proposed to be built alongside of it, to be employed as a market for choice flowers by day, and as a provision store for the house by night.

The increasing passion for music has also led to the erection of three or four large music halls—to say nothing of as many 'music and supper halls' for a less refined auditory, but which in size and style of decoration would a few years back have excited little admiration if constructed in those aristocratic circles. The first of the former kind, St. Martin's Hall, Long Acre, built primarily for the use of Mr. Hallah's music classes, was first opened in 1850, but only fully completed in 1853. The great hall is 121 feet long, 35 wide, and 40 feet high. In the same block, situated facing the Piazza, Sir William Pulteney Smith's magnificent edifice was erected. The whole story of this building was designed by Mr. W. Westmacott. In form and general appearance it has been modelled on the old baronial hall, though a handsome and well proportioned room, it wears too sombre an aspect to be of much artistic pretensions. A notable feature of the interior is the spacious picture gallery, with loggias, 110 feet long, and which, as the house is to be a public, or rather private factory, would be in every way worthy of its magnificent contents. Scarcely less palatial in scale or style is Dorchester House, Park Lane, erected in 1858-59 for Mr. S. Holford, in style it belongs rather to the Italian than to the English renaissance, as represented by Inigo Jones, than to the Italian adopted by Barry; and in many respects it is hardly so satisfactory, but it is a stately and imposing structure: its dimensions are 135 feet by 105. The mansion of Mr. H. T. Penrose, built by Pugin, has the Gothic revival designs of M. Dalou, at a cost of 30,000/. also deserves a word of notice, though in an artistic point of view it cannot be considered a happy effort. Like the mansions just noticed it is fitted up with great splendour, and like them it contains a singularly choice collection of pictures, and the finest collection of works by the Dutch and Flemish masters in this country.

Turning to 'The City,' we are at once struck by the great improvement in the ordinary street architecture, which is still more distinctly manifested than at the west-end, though at the west-end the improvement has not been incon siderable. In the new streets have sprung up a long succession of warehouses of a size and coldness quite un precedented in London. Many of them are faced with stone, decorated with carving, and make considerable architectural pretensions; and all are built in a style of construction at once bold and substantial. The most striking feature of these new buildings is the great variety of their form, five, six, and even seven stories being far from unusual. Of these warehouses the most noticeable are those in New Cannon Street: and its vicinity, Wood Street, &c.; but piles of 'offices' of almost or quite equal magnitude have been built, or are building, in every part of the city which lies within the business boundaries, in the narrowest alleys, courts, and lanes, as well as in the main lines of traffic. The most remarkable of these blocks of offices for extent is one which is impossible for an architect to look at without a certain feeling of horror and disgust. It is a most hideous specimen of that sort of architectural art which is practised in the city, and the grandeur of mass, and greatness of manner, combined with simplicity, it surpasses everything else in the metropolis.

Unfortunately on the removal of the Excise department no other use was found for it, and it was destroyed to make way for a building of about the same dimensions as the former, and a greater number of separate offices than any other in the kingdom.

Another class of city buildings which has done much to raise the character of London street architecture is that which includes the office buildings on Broad Sanctuary, which by Sir Robert Smirke, has been made to give place to a much more ornate façade by his brother Sydney. This, however,
opposite to each other in Threadneedle Street, the Australian Bank by the Royal Exchange, and several others of more or less architectural pretensions; and among them must now be placed the well-known South-Sea Bank. This was completed in 1808, at a cost of £100,000, and the bank had eminence as the corporation for which it was originally built—the Royal British Bank. Among private establishments may be named that of Jones, Loyd, and Co., in Lothbury, whose new office, by the remodelling of a former building, was completed in 1813. In many cases in this connection refer to the as yet unfinished offices of the National Discount Company in Cornhill, which is a work of unusual florid character, as well as of considerable size—but the ornament is mere stucco, and the whole affair looks rather like an immense potsherd. The Pantheon and the Pantheon Hotel, now the best of the recent city insurance offices are the Sun (by Mr. Cockerell), in Bartholomew Lane, and the Imperial in Threadneedle Street: the latest are the Royal, in Lombard Street; the Union (a substantial hut rather plain building) in Cornhill the Crown, with some piquant Byzantine features, in Bridge Street; and the Law, in Chancery Lane.

Some of the City Companies have also built new halls, or put new fronts to their old ones. The largest of the older City halls, the Merchant Taylors', in Threadneedle-street (erected by Jarman after the fire of London), has been concealed from view by a screen of offices of no great elegance built by the company. The Weavers' Company have built themselves a new hall in Basinghall Street—a substantial structure, but deformed by a misdirected and over-elaborate scroll. A rather similar structure to offices. A somewhat better building is Dyers' Hall, Dowgate Hill, (by Mr. Corbett); but, like the companies just noticed, the Dyers have combined profit with display, having also thrown a couple of extra storeys to make a large banking-office to contain offices. The Clothworkers in their new hall, in Mincing Lane,—now in progress, from the designs of Mr. S. Angell,—have been less thrifty. Their building is wholly appropriated to the purposes of the company, and it is a very costly, as well as a substantial edifice. The façade, which is of Portland stone, is Italan, of a somewhat florid character, and, like the interior, it is much enriched with carving. The chief feature of the interior is of course the great cornice, which carries the whole portion of the building to the mezzanine offices. The Clothworkers in their new hall, in Mincing Lane,—now in progress, from the designs of Mr. S. Angell,—have been less thrifty. Their building is wholly appropriated to the purposes of the company, and it is a very costly, as well as a substantial edifice. The façade, which is of Portland stone, is Italan, of a somewhat florid character, and, like the interior, it is much enriched with carving. The chief feature of the interior is of course the great cornice, which carries the whole portion of the building to the mezzanine offices.

In shop architecture the City has also of late taken the lead. A very recent example—a silversmith's shop in Cornhill, which is the Exchange, is in my opinion the finest and most pretentious specimen of shop architecture in London. As an illustration of the tendencies of London shop architecture in the last thirty years, and the influence of the Exchange, the shop is a most interesting and instructive example. The Exchange, though not more than 40 feet wide, rises to a height of about 100 feet. The shop is 26 feet high, and the whole of the front above it—of Bath stone—is carried on a wrought-iron tubular girder, which is borne (or seemingly so) by red granite pillars having Corinthian capitals of Bath stone. The upper part, of four stories, has attached Corinthian pillars of polished granite; a balcony at the fourth story; and crowning the summit a very bold cornice. The style is Very correct, and a great deal of ornamentation is everywhere introduced. In fact, a description of the whole building would be an exhibition of the statement of the story. The space between the arch of the shop-windows and the cornice above is of statuary marble, carved in a bold and florid style by Trenantova. On the whole, the façade has a rich and striking character, with an allowable excess of ornament, the chief defect being the appearance of weakness, arising from the want of sufficient apparent support in the ground story for the enormous mass of Ist. The disagreeable aspect which a building so narrow, as compared with its height, necessarily has, is removed by the house on each side being built of a uniform height, though somewhat lower than the central building, and in a similar though much plainer style, though, of course, it partakes of the support but being plainly subsidiary to the central compartment. The interior of the building is even more ornate than the exterior. The ground floor is open to the room above, around which runs a broad gallery supported by coupled Doric columns, over which are coupled composite columns with shafts of coloured marble. The ceiling, like the gallery, has deep and richly ornamented coffer, the beams being supported by coupled carayaltic figures. From the window of this gallery a view can be obtained of the profusion of coloured marbles, carvings, looking-glasses, and decorations, with the glittering stock rather dazzling than satisfying the eye. Such a building as this, with all its faults, shows of how much consequence shop architecture is to the accommodation and comfort of the public. It may perhaps be said that the abilities of architects of artistic tastes, constructional knowledge, and original fancy. By Mr. Rees' and his followers shop architecture is denounced in unmeasured terms. But shop forms of necessity the greatest space being the whole, and the shopkeeper in such a city must endeavor to render their places of business as attractive as possible. If houses are to be built expressly for shops, there can be no good reason why architects should not construct them as ornamental and beautiful as possible, and as is consistent with the purpose for which they are designed. In the great majority of recent shops everything else has been made to yield to the desire for as large a surface of plate-glass as possible; and hence what was indicated as the most palpable fault in the shop front just noticed—the want of sufficient apparent support in the ground story for the floors above—is the almost universal defect in the showier class of such buildings: and it is a fault fatal to all architectural effect. It is the excess in the height of the Exchange that makes the whole upper part of the house rests on a heavy carved cornice, and this, with that which it carries, on two immense sheets of plate-glass. Yet, if possible, the absurdity has been rendered even more palpable by the churchyard which has been made into a garden by throwing two or three houses together, is made in appearance to bear the whole superincumbent mass of brickwork upon a few slender glass pillars, and even the wider attached pilasters at the end are covered with looking-glass. The case of course in all these cases is the same. The supports are really supported on wrought-iron girders, and for bearing these sufficient provision is made by strengthening the side walls, and by adding piers, &c., where necessary. Now, conversely, it is the appearance which is to be considered. It is the eye by giving to the shop front an arched form, and thus inducing the appearance of sufficient support for the upper stories—a method which the shopkeeper will not in many instances allow, and when he does, will probably shorty destroy the effect of by some gaudy decorative additions—why not accept the necessities of the case, and endeavour honestly to surmount them? Railway and other recent engineering works have too much accustomed the eye to the girder for its vast strength to be for a moment questioned the view of the whole street, and the Exchange is at last but a part of the great building, and its supports be satisfactory, there will be no doubt—one of the latent doubt even which unconsciously produces the feeling of distrust in the un instructed observer.—of the sufficiency of the supports of the building. What seems to be wanted, then, is to frankly admit and not to endeavour to conceal the girder form, and to give to the supports the greatest possible emphasis. Then trinial, equally with circular or pointed arches, architecture will be found to satisfy the eye as the primary essential of security, while it alone can be found adequate for the varied requirements of the London tradesmen of this present century, as it alone can, within due limits as to altitude, securely bridge over wide spaces. It has the advantage of giving a better opportunity of afford ample scope to the architect's inventive skill. Where a very wide window surface is not required, a different method of treatment is applicable; and the stationer's shop at the corner of Chancery Lane is a favourable example of what may be done under such circumstances, and a sufficient illustration of the opportunity which shop architecture affords for architectural taste and ingenuity; and also, we may remark in passing, a satisfactory illustration of the great rectitude in London of the current tendency to adopt at one and the same place an adjacent to well-executed brickwork in London street architecture, when it is used as composition and not as a deceptive imitation of stone.
facade certainly improved its general character; and Newgate prison, of which the whole interior has been rebuilt on a very superior plan, while the exterior—a classic example of prison architecture in general estimation—has with excellent taste been left in its present state. It is associated with Newgate in the architectural mind, as being by the same architect, Dance, very similar in design as well as purpose, and its near neighbour, Gibsop-street Compton, has however been less fortunate, having been pulled down when the street was widened; the site is still unoccupied, as is also that of the Fleet prison, pulled down in 1844. The new City Prison at Holloway is an extraordinary looking castellated pile, of great size and expense, and was for a long time the object of much sanitary and healthful place inside. Two or three other prison-palaces have been constructed within the last few years for the care of metropolitan rascals: the chief being the model prison, Bentonville, and an enormous structure on Wandsworth Common. Of semi-public and corporate buildings outside the city walls a few must be noticed. Lincoln's Inn Buildings, of which the first stone was laid by Vice-Chancellor (now Lord Justice) Knight Bruce, April 20, 1843, and which were inaugurated by her Majesty, October 30, 1846, form one of the most striking and picturesque of the recent buildings of the metropolis. They consist of a dining hall, a library, and a benners' dining and council rooms, needless by a handsome vestibule; the architect is Mr. H. H. Peto. The buildings are both in the Tudor domestic style, and are constructed of red and black bricks, with stone quoins and dressings—the whole being executed in the best manner. The dining hall is 130 feet long, 45 feet wide, and 64 feet high, with a handsome barrel-vaulted ceiling; and the outer facade is of five large and handsome windows on each side, two large windows at the eave, and a noble window of five lights at the opposite or south end. All the windows are enriched with heraldic emblazonings, the pendants of the roof are gilt, and the front of the building is adorned with sculpture: on the whole it is undoubtedly the finest room of its kind in London—we are of course not comparing it with Westminster Hall, which is wholly different in character. The builders and company who have designed this very handsome room,—80 feet (or including the orielis 90 feet) by 40, and 35 feet high—its chief features being an elegant semi-octagonal arch at each end (like the windows in the hall enriched with stained glass), and an oak roof of good design; as a reading-room it is comfortable and even luxurious in its arrangements. In the Temple, New Buildings, somewhat similar in style but less imposing in intention and effect, have been erected by Mr. Sydney Smirke, R.A. With these we may place, as californian in style though not in object, University Hall, at the back of University College, by Professor Donaldson. The Abbey Buildings, Dean's Yard, Westminster, require special mention as a very admirable though not serviceable building, the design of which is due to Mr. Gilbert Scott, whose recent advocacy of a free adaptation of Gothic "as the basis of future development" in English architecture has attracted such very general attention. The Bromptom Building for Composition (by Francis) is of large extent, and the design of Mr. L. E. Pearson. Lamb. The Small Pond Hospital, near Highgate, is admirably situated, and has some good features; and something similar may be affirmed of the Convalescent Hospital at Walton. The great extent of the city of London has necessitated its being judiciously placed in healthy sites at a little distance from London: such are the Working Orphan school, a large Italian edifice on Havercost Hill, the Orphan Asylum at Wanstead, the Royal Patriotic Asylum at Wandsworth General Hospital, in Ashberry, Middlesex, the Asylum of London Orphans' at Brixton, the City Industrial Schools, at Peug, the South Metropolitan Industrial Schools, at Sutton, Surrey, the Whitechapel Industrial Schools at Forest Gate, Essex, and many others. London is indebted for some recent additions to its architecture to railway progress. The new terminus of the London and North Western Railway, by Hardwick, is really a very fine and costly structure; its expense was about 150,000/. Scarcely so much is the case with the terminus of the Great Western, as it is rather remarkable as an engineering than an architectural work, but it has the superior merit of showing adaptation to its purpose in a very usual degree, and, to our thinking, is consequently the most satisfactory of all the London termini; it was the joint production of Messrs. Brunel and Digby Wyatt. Adjoining it is a hotel built for the railway Company by Mr. Hardwick, which is in size, architecture, and comfort, surpasses any yet constructed in London. The style—late French renaissance, with its bold mass of roofs to the centre and turrets, the colossal terminal figures supporting the arches of the main entrance, &c.—is a novelty in London, and altogether it excited much notice. The terminus of the London Railway, at King's Cross, by Mr. L. Cubitt, merely presents, externally, brick terminations to the carriage sheds, with a lofty central tower; but inside the vista formed by the sheds and offices is magnificent. The London and South Western Railway Company have built an hotel rivaling in size that of the Great Western: like that the style is continental, but rather strange than beautiful. None of the other metropolitan railway termini of recent erection have any architectural character. Though we have left ourselves no room to describe, we must just refer to the great works completed and in progress in connection with the docks of London. Of those of the Metropolitan Waterworks, the most extensive is the works of the London Docks at Shadwell, to way for which many hundreds of houses have been removed. The object has been to afford greater facilities for the admission and unloading of the immense vessels which the requirements of modern commerce have called into existence, as well as to obtain improved room for general purposes. With this view new basins of great depth have been formed, a new entrance constructed, with gates of enormous size, and various hydraulic and other appliances added of great power, as well as new wharves and other works. At the Commercial Docks, on the Surrey side of the Thames, extensive alterations and improvements have been carried out. On the Philo, or Marshes, just below the Blackwall, have been formed, on the site of the once famous, which affords at present about 90 acres of water area, with entrances admitting larger vessels than any of the older docks, though not, we believe, larger than the new works at the London Docks mentioned above. At Woolwich, a steam dock has been constructed, and vast works of various kinds erected, in connection with the arsenal, foundries, steam factories, &c., of the Government. And, finally, at Brentford a large new dock has been constructed, chiefly with a view to afford increased facilities for water carriage in connection with the Great Western Railway. A few words on some of the larger works resulting from the progress of sanitary reform will conclude what we have to say respecting the public improvements of London. After the mid-19th century, corporal diets for the working classes in London were the result of the sanitary reforms of the 1850s, to remove their sordidly cherished Smithfield market; but it is due to them to say, that when compelled to provide a new cattle market in the suburbs instead of in the centre they have done what was right, and that the houses, to which the site chosen was an elevated and very convenient one, the notorious Copenhagen Fields, adjoining both the Great Northern and North London Railways. The market covers an area of about 35 acres, but a large space is reserved for cattle, and for extensive buildings for the sale of meat at a future time if it be found necessary. The provisions for the comfortable accommodation of the cattle have been made in a thoroughly humane spirit, and, in fact, whatever forethought or foresight in the evil day have been the result of large cattle markets has been done with a bold disregard of expense, which only a corporation wealthy as that of London, content
to look to a somewhat remote future for repayment, could have ventured upon. Though it is rather on account of its skilful arrangement and adaptation to its special purpose that the Metropolitan Cattle Market is to be regarded, yet it is made, as it were, a part of the architectural arrangement of the Cattle Exchange, its banks, and one of the offices are in very good taste, and its lofty central tower forms not only a prominent feature in the landscape for many miles northward, but gives an air of completeness and unity to the whole design. The Great Metropolitan Drainage Company, with the details of its arrangement, is due to the city architect, Mr. Bunning, who also, two or three years before, had rebuilt Billingsgate Market in a very skilful manner, and with a special regard to convenience, cleanliness, and propriety. But the most important and rendering it unlawful for any water-company drawing its supply from the Thames, to take such supply after a certain day from any part of the river below Teddington lock. The several companies accordingly at once set about the construction of very extensive works, the Grand Junction, the West Middlesex, the Vanxhall, and the Southwark, at Hampton; the Chelsea and the Lambeth just above Kingston. The works at these places are some of them, on a magnificent scale, the entire new works, for example, of the Chelsea Company, rendered necessary by the Act, have cost 430,000. The water is conveyed from Hampton and Kingston, in mains of from 30 inches to three feet in diameter, to the reservoirs of the several companies in the suburbs of London; and the companies are passed under the Thames at Richmond by means of the coffer dams; those of another company are carried above the bed of the river, near Putney bridge, on piers formed by Mitchell's screw piles. But even more extensive works have been the new works of the Chelsea Company, who, in works near the head of their river (including the drainage and diversion of the sewerage of the town of Herford), in forming capacious new reservoirs, and covering their old ones, &c., has expended considerably over half a million. Very extensive new works, and alterations in existing works, have also been carried out by the East London, the Kent, and the Hampstead companies.

The result of these vast operations has unquestionably been to increase the purity and quality of the water supplied to the inhabitants of London. The Registrar-General, in his Report on the Health of London for the week ending April 17, 1858, says that the London water "contains less than half the previous amount of impurity. A gallon of water of the Chelsea Company formerly contained from 37 to 66 grains of extraneous matter; the Southwark water contained from 23 to 73 grains; while the analysis now shows that only 21 grains of extraneous matter are contained in a gallon of water of the whole company. In several of the other companies a still smaller quantity of extraneous matter is found (in the West Middlesex only 17-64, in the Grand Junction 17-76 grains); but then the water of those companies was always purer than that of the first. They have, too, been more economical and costly an alteration was rendered compulsory,—the legislature might not well have gone further, and prohibited the use of the Thames at all for the purpose. For before it has reached the place where the supply is now drawn, it has been polluted by the drainage of Windsor, Chesham, Staines, and other towns, and, as Mr. Ranger, the Superintending Inspecto\r of the General Board of Health, has pointed out in his recent Report on the Sewerage, &c., of Aldenham villag...
Cockerell, may not only be fairly placed in comparison with any similar building in London, but without hesitation be pronounced in many respects the finest, as it is undoubtedly the richest, recent example of a Romanesque-Gothic edifice in the kingdom. The hall itself, 168 feet long, 100 feet wide, and 80 feet high, is spanned by a vaulted roof, and forms one of the noblest public halls we possess. The rooms devoted to the assize courts are not so satisfactory. The exterior has, at the south end, a Corinthian portico of grand proportions, with a pediment filled with sculpture; a semicircular niche with a statue of Edward I., and a niche in each story of sixteen columns without a pediment at the side. It is not impervious to criticism, perhaps, but undoubtedly St. George's Hall is one of the great architectural works of the day. The Continent has acquired a Colledge Institution, a large and handsome Tudor collegiate structure, also by Mr. Elmes; the Sailors' Home, a spacious Gothic building by Mr. Cunningham; the Branch Bank of England, by Mr. Cockerell, &c., but perhaps the most characteristic of the new buildings of Liverpool are the extensive and costly piles of offices, which are as much superior to similar buildings in London as the Manchester warehouses are to the warehouses in the City. The Docks of Liverpool, with vast ranges of connected warehouses, have been increased in size by the erection of a range of buildings of millions sterling, and are now probably unrivalled. The floating stages on the Mersey, for landing from steamers, likewise claim a word of notice: one, at Prince's Pier, finished in 1857, is 82 feet in diameter, has a capel, or chapel, of 40 feet by 140,000/. Liverpool is one of the towns which has provided itself at a great cost with a supply of pure water from a distant source. Whether as a rival or an adjunct, its neighbour on the Cheshire side of the Mersey, Birkenhead, cannot be regarded as in danger. The Docks of Great Liverpool are the Docks of the world; and by the addition of not much little addition to its existing architectural treasures, are restored and re-edited its old ones. Many of the new works are of great beauty and richness, as could not indeed fail to be the case, for they arose out of the promptings of a zealous and enlightened body of Government, and from the spirit of no niggard-hand was entrusted to architects already famous for their peculiar devotion to this branch of the art. It is, perhaps, not too much to say, that some of the new works are very strongly inside the glorious structures which surround them. But we would pay the highest praise to the so-called 'restorations.' They may have been well done professionally: they may have been correctly performed according to ecclesiastical conceptions: but the buildings which have been, restored are not now the buildings we knew a few years back, venerable in their hoary and unmistakable antiquity. They have been, too many of them, made to wear the gay drapery of youth upon the seared and bending frame of age. They now consequently exhibit either the solemn majesty of the one, or the lightness beauty of the other. Our ancient Gothic structures,—marvels in the grandeur of their forms, in the evidences of mental power and artistic fancy, in their quiant carvings and playful combinations of the beauty of line and love to longer,—structures on which the cultivated and the untaught alike swoon in awe and wonder and endless admiration,—ought only to be touched with a reverential hand. Our fathers, bowing before the sovereignty of the Greek and Roman, regarded our glory in the heights and meaner parts of our built productions of a dark age and a Gothic understanding; and they altered, improved, or destroyed them with almost equal indifference. But their contempt was, we cannot but think, less dangerous than our too ardent love. They thought it no vanity to spend time over the structures of the dark ages, when they could study the temples of the brightest days of Greece and Rome, or of those enlightened times when the lore of antiquity was restored to the scholars of modern Europe. They were already adorned by the decay of modernism, and in our foolish fondness have sought to restore them to their old beauty. All which we have replaced was the only true one—that we have indeed copied, but in copying have destroyed it. Re- translation in truth is for the most part a mistake. Ancient buildings regarded as works of art are to be preserved—like all other ancient structures, historically and for their light on the life of the people of the modern artist. If anything can be done to arrest their decay, well: but it must he so done as not to remove, if possible, a hair or a finger-nail of the original—assuredly not to substitute for its decay. For it is clear that, if we are to take in what the chipped and battered fragment we have removed was in its pristine condition. As well might the Thebes or Ithysus in the British Museum be submitted to the 'restoring'
chirol of Westminster or Bally, or any other living Philale, as our cathedrals and colleges are subjected to the tender merci

...of modern representatives of the ancient builders. We are not, of course, objecting to necessary repairs, or even, where impracticable, to rebuilding, but simply to the destructive process of thoughtlessness, the rest of our present course of teaching — the attacks on the character — the character of the old art, and replacing them by new work intended to represent (and therefore to form a deceptive imitation of) the old art on a large scale.

Cambridge has proceeded somewhat more slowly of late than the sister university with its mediæval reproductions and restorations, but it too has made a real architectural advance. Such works as those which in the first quarter of the last century, while the society of the old mediaeval idea were still enthusiastic gowmen, would now excite a shout of universal execration. But Cambridge retained longer than Oxford her love of the classic orders; and some of her latest works of that kind are of a very superior character — as the library by Cockerell, and still more the Fitzwilliam Museum, a work of much beauty and stateliness. But not to dwell longer on particular towns, we may point to the number of the different kinds of public buildings which have been erected in every part of the country as the best evidence of the reality and extent of architectural progress. In ecclesiastical edifices the progress has been something wonderful. During the last twenty years churches and chapels have been built by the thousand, and a very large portion of our ancient and picturesque churches have been repaired, or as it is termed 'restored.' As in London, so through the country, all the recent churches have been mediæval in character; indeed, as Mr. Scott observes, there are few instances of this in one of his recent contributions to the literature of Gothic architec

...neighbourhood justify the appeal. We feel safe therefore in saying that the public feeling for church architecture, and the public wish for church extension, are deeply rooted as well as widely spread, and that great as has been the progress of church building and church architecture during the twentieth century, so great will it be in the next. Twenty years will see a yet greater extension of the one, and we earnestly hope a great advance in the other.

As may be supposed from the character of the revival and the faith of one of its earliest, ablest, and most active champions — Welsey Pugin — the Roman Catholic body have fully participated in the Gothic movement. Indeed some of the finest and richest of the recent specimens of Gothic have been the Roman Catholic cathedrals and churches at Bir-

...reformed clubs, a number of significant examples would still very numerous have been the dissenting churches built within the last twenty years, and not a few of them have been of spacious dimensions and of considerable archi-

...the greatest proportion of instances of old rebuilding, and among the Independents — who have taken the lead in the chapel building movements — the Gothic style has been adopted in the great majority of instances; so it has, though not to the same extent, among the Wesleyans: the Baptists have come more slowly; but after a time the United, who have adopted the classic; the Quakers as of old repudiate altogether: but all build where they can find opportunity and means, and all build in a far superior manner to that in which they built thirty or forty years ago.

Among the general features of the period of which we are treating, a place alongside the extraneous church-extension movement, and accompanying revival of Gothic ecclesiastical architecture, must be given to the parallel ex-

...of sixty of the educational establishments of a superior class, and the revival of the old collegiate style of building. Not to speak of what has been done in college extension and new building at Oxford and Cambridge, at Eton, Harrow, Rugby, &c., we can but mention, as among many, such magni-

...by Mr. Wilson, at St. John's, Hurstperpoint, Sussex, by Mr. Carpenter; at Cuddesdon, near Oxford, by Mr. Street; the Laneadowne College, at Bath, by Mr. Wilson; the Wellington, at Sandhurst, &c.: theological institutions belonging to the Independent sect at Birmingham, at Mr. Medland, Irwin, New College, St. John's Wood, by Mr. Emmett; and at Spring Hill, near Birningham, by Mr. James—all spacious and handsome edifices in the Tudor collegiate style; and the institutions in connection with the Wesleyan movement at the Wesleyan College, at Richmond, Surrey, by Mr. Trimen; at Taunton, by Mr. Wilson; and the school at Kingswood, near Bath, by the same architect.

...n by a larger or smaller extent of ancient examples, who have not resorted to altered forms of worship and modes of thought, has the double disadvantage of curbing the genius of the architect, and of preventing the erection of an edifice designed with a single eye to its use and character. Many of the recent churches are however — with the qualific-

...in the case of the new church at Doncaster (rendered necessary by the occupation of the old church) a strong appeal to a wider public is sure to meet with a cheerful response, if an announcement can be made that the building is to be a magnificent work of art, or the exigencies of the neighbourhood justify the appeal. We feel safe there-

...in 1857, at Ashby-de-la-Zouch, at West Harptpool, and elsewhere: Corn Exchanges, on some of which a large amount of money has been expended — at Colchester (by Raphael); at Norwich (by Mr. Irwin), perhaps the most finished example in the country; at Grantham, at Hitchin, at Louth (a handsome Venetian pile, by Mr. Bellamy); at Banbury, at Hemel Hempstead, at St. Albans, at Grimsby (Elizabethan, by Bellamy and Hardy); at Gloucester (a large and ambitious Corinthian edifice, by Medland and Mabery); at Hereford (Italian, by Mr. Holmes), &c. — Assist Courts at Reading (by Mr. Clary); at Taunton, at Swanscombe, &c.; County Courts, Post-Offices, Music Halls (some of the very recent ones, like that at Birmingham, the New Market, London), and at least in the protective works; Lyceums, Mechanics Institutes, Free Libraries, Baths, &c.

...beyond the limits of the towns among the largest and most costly, and from their size and character often the most remarkable modern buildings, are the Manufacturers' Asylums, but it must suffice to refer to them thus generally. The County and Borough jails are often curiously enough works of an inordinately ambitious architectural character; such as Rochdale (by Mr. Hardcastle); Swindon (by Mr. Stone); and there are now in England at Protestant and G Roman Catholic, must likewise be named in this connection.

...of industrial establishments of a more pleasing order — such as Marshall's Flax Mills, at Leeds; the extraordinary manufactories of the Westmoreland Mill at Bradford, and other great manufactories of recent erection — we should be glad to speak for, they, in their architectural character, and in their admirable arrangements, are among
the most striking evidences of material improvement in the country. But we must pass them by, as we must also pass by the many others, the work of which is connected with the railways, remarkable and notable as they are. In every way are among the recent public works of England. So again we must pass by the magnificent new docks, &c., as well as those constructed by public bodies in the town of London, the Thames at Blackwall, and elsewhere, as vast as they are in extent, and costly but most important in character; and the equally magnificent works which have been in progress in the south of England, which are to provide accommodation for our large mariners harbours from the perils which beset them. The defensive works which are erected on the more vulnerable parts of our coast, and for affording additional protection to our naval ports and arsenals, hardly public buildings in the best sense of the word. Even on Public Improvements, hence such an article ought scarcely to conclude without at least a reference to the great naval and military hospitals which have been recently erected or are in progress at Plymouth, Portsmouth, Spithead, Chatham, &c.; and although we have heard much of deficient barracks accommodation, even that must be largely increasing, and ought to be rapidly improving when we see by parliamentary returns that in a single year, 1856-7, upwards of a million sterling has been spent in building barracks and stables at various stations (amounts 868,008l., repairs 292,746l.). Of the many mansions which have been erected in the country we must also refrain from speaking, though the list is headed by her Majesty's Marine and Highland palaces at Cowes and Dalmoral.

112. The most important single undertaking of the present time was undoubtedly set forth the progress of public improvement in England during the last twenty years. In Scotland and Ireland architectural progress, taken as a whole, has not been proportionate to that of the sister country; yet when we look at the noble buildings which have been erected in Edinburgh and Glasgow, the unrivalled railway termini and some other recent buildings in Dublin, the warehouses and public works in Belfast, the Irish Queen's Colleges, &c., we cannot but feel that we have made a great stride in the path of architectural progress during the past twenty years.

PUBLIC LIBRARIES. [LIBRARIES, PUBLO, S. 2.]

PUFINUS. [Petrvs.]

PUGIN, AUGUSTUS, an eminent architectural draftsman, was a native of France, but settled in London at an early age. He was engaged as a draftsman and assistant by Nash, with whom he remained many years. He then found employment at the old firm of Inigo Jones, and at the same time was engaged in Architectural drawings for engraving; one of the most important of his earlier works being the engravings in Ackerman's 'Microcom of London,' 1808-11. He also made the drawings for a 'Series of Views in Islington and Fentonville, with descriptive text'; and in 1821 he published a work on his attention more particularly to the architecture of the middle ages; and in 1821 he began the publication of his 'Specimens of Gothic Architecture, selected from various Architectural buildings in England; consisting of Plans, Elevations, Sections, and parts at large; calculated to exemplify the various styles, and the practical construction of this class of admired Architecture;' it was completed in 1823, and forms 2 vols. folio and 4to, containing 144 plates, with descriptions, chiefly by Mr. E. J. Wilson. In 1824 he commenced, in conjunction with Mr. John Britton, 'Architectural Illustrations of the Buildings of London,' also completed in 2 vols. 4to; and with the same gentleman he published, in folio and quarto 1825-29, 'Specimens of the Architectural Antiquities of Norman and Gothic Architecture,' by A. Pugin, and engraved by John and Henry Le Keux. This is his best and most important work, and did much to enlarge our knowledge of mediæval architecture; he was assisted in this work by his son, the subject of the succeeding notice. In 1839 Mr. Pugin made the drawings for a work entitled 'Paris and its Environs displayed;' and in 1833 he prepared, with the assistance of his son, 'Gothic Ornaments, selected from various buildings in England and France.' He died December 8th, 1860.

PUGIN, AUGUSTIN WELBY NORTHMORE, son of the preceding, was born in 1811. Instructed by his father in the principles of architecture, he early acquired under him considerable practical knowledge of the business, and was employed as assistant, collecting materials in Normandy and England for his works on Gothic architecture. [Pugin, A.] His first distinct employment was as assistant to Messrs. Gribbe, in painting the architectural scenery in her Majesty's and Covent Garden theatres. He was furnished with a variation of drawings for the furniture in Windsor Castle, and designs for in the usual style for Messrs. Rundell and Bridge. In 1833 he removed to Ramsgate, and commenced preparing for publication a series of works illustrating the furniture and ornamental work of the period, as shown in the ancient edifices of England. 'The Gothic Furniture, in the style of the Fifteenth Century,' and 'Designs for Iron and Brass Work, in the style of the XVth and XVIth centuries.' These were followed in 1836 by 'Designs for Gold and Silversmiths' Work,' and 'Ancient Timber Houses, all of which were received with marked favour, and tended not a little to stimulate the growing taste for Gothic forms. His next work was one that, by its curious and irritating way of setting forth some home-truths, aroused not a little professional animosity. In the late periodical, 'The Builder,' he published the Noble Edifices of the 14th and 15th centuries, and similar buildings of the present decay of Taste,' a second and improved edition of it was published in 1841.

Mr. Pugin had by this time joined the Roman Catholic Church, to the service of which he henceforth devoted his best energies. Having received a handsome bequest from an aunt, Mrs. Welby, he built himself a fanciful residence in the neighbourhood of Salisbury, and removed there, resolved to give himself unreservedly to the work of a designer and architect of a Roman Catholic Church, and to attempt the reconstruction of the middle ages. Having found in the Earl of Shrewsbury a warm patron, Mr. Pugin soon obtained opportunities of exerting his ability; and during the few years that he lived to practise his profession he was called upon to execute a large number of buildings for monasteries, convents, and schools, than has probably fallen to the lot of any Englishman since the Reformation. The following list, we believe, includes his chief works—(we are indebted for it, and many of the other facts contained in this notice, to a memoir of Pugin by his friend Mr. Talbot Bury, who appeared in the 'Builder shortly after Pugin's death')—: The cathedral church at St. Marie at Derby, one of his earlier and more pleasing works; St. Chad's, Birmingham; three churches in Northampton; St. Wilfred's at Wilton near Alton; a church, and a convent and chapel, at Nottingham; convents of the Sisters of Mercy at London, Birmingham, and Liverpool; a priory at Downside near Bath; the vicarage of Hawkhurst, Kent; a convent and convent at Edge Hill; churches at Oxford, Cambridge, Reading, Keighworth, Stockton-on-Tees, Newcastle-upon-Tyne, Preston, Kloof, Rugby, Northampton, Stoke-upon-Trent, Bolton, Wrexham, Lichfield, Hexham, Deventer, and Swanage; a new Manufacturing Institution, and a convent and church at St. George's (Southwark), Killarney, and Emmiscotry. To these must be added the extensive and costly works executed for his great patron the Earl of Shrewsbury, consisting, besides his palace at Shrewsbury, of houses, schools, and a convent, and monastery at Alton Towers; and a church at Cheddle, which has the most splendid interior of any of his churches. The very pretty gateway to Magdalen College, Oxford, is one of the few works executed by him for any Protestant body; indeed he is said to have refused to accept any commissions for Protestant places of worship. The list of works given above would in truth seem to have been more than sufficient to exhaust the time and energies of a man who ceased working at the age of forty; yet he was chiefly employed during his last years in designing and superintending the ornamentation of the New Palace of Westminster, which probably owes its somewhat extravagantly mediæval and ecclesiastical character to Pugin's idiosyncrasy and impatience of modern style. But in the practice of his profession, he found time to add to its literature a second and revised edition of his 'Centrals'; a treatise on the 'True Principles of Pointed or Christian Architecture,' 1841; 'An Apology for the Reformation of Christian Architecture,' 1843; a 'Glory of Ecclesiastical Ornament,' 1844; a treatise on 'Floriated Ornaments,' 1849; and 'A Treatise on Chancel Screens,' 1851. We ought also to add that he was connected commercially with the house of Mears. Hardman of Birmingham, who manufactured mediæval and ecclesiastical houses of wood; and it is said that he had filled np his leisure hours with landscape-painting.

Mr. Pugin had always been fond of the sea—(indeed it is stated in one of the biographical notices of him that he once said to an old master at sea, 'You poor seaman! Why, you're living in Holland,' though it is difficult to see when that time could have been)—and having realised by his profession a
handsome sum, he purchased an estate at Ramsgate, in order
at once to enjoy his favourite element, and carry out un-
feathered his notions of architectural propriety. Here he expended
all his property in erecting for himself a house, a church,
schools, etc., the whole being dedicated to St. Augustine. As he
lived in peace in his religious feelings took more and more
entire possession of him. He now (1850) wrote and pub-
lished 'An Address to the Inhabitants of Ramsgate,' An
Earnest Appeal for the Revival of the Ancient Plain Song,
'The Present State of Public Worship among the Home
Catholics,' and 'On the Ecclesiastical Architecture of a Great
City.' At length, overthrown by all these excessive labours and ex-
termination, his intellect began to give way, and in his fortieth
year it was deemed necessary to remove him to a lunatic asylum.
For a brief space his mental powers were so far restored that
it became practicable for him to return to his home at Ram-
sgate; but his life was ebbing, and he expired there on the
14th of September 1852, three days after his return. He
was buried in a vault of his own church of St. Augustine.
He had been three times married, and shortly after his death
a pension of 100l. a year was granted to his widow from the
Civil List.

As will have been seen, Mr. Pugin was a man of extraor-
dinary industry and energy, and he possessed a phlegmatic
and philosophical mind, and a great ability. He attempted too
many things, and he worked too much and too fast to pro-
duce many great works, even had he been a man of original
power; but in truth his was not a creative mind, and he
lacked comprehensive thought. His great principle was, that,
except as to size, the architect should aim at a faithful
reproduction of an ecclesiastical edifice of the medieval
period; or, as he said it in his 'True Principles of Pointed
Or Gothic Architecture,' 'We may indeed improve in me-
chanical art; a master to guide its construction—we may even
increase its scale or grandeur; but we cannot successfully
devote one tittle from the spirit and principles of Gothic
architecture. We must rest content to follow, not to lead.
We may indeed widen the road which our Catholic fathers
formed, but we cannot depart from their track without a
certainty of failure being the result of our presumption.'

Following such a dogma, it is evident that the highest success
must be a respectable imitation. But even on his own prin-
ciples was woven to his works are entirely satisfactory as a whole;
in particular parts and in details he is generally very happy,
and some of his interiors have a rich and pleasing effect. His
writings have had a powerful influence on the taste and prac-
tice of professed architects, and still more on the taste of
ecclesiastical amateurs, and the influence has not been entirely
a happy one. More than any single man perhaps has he been the
cause of that perverse fashion which has predominated
during the last fifteen or twenty years, of building modern
churches in all their parts on the precise model of the churches
of the middle ages, although—at least in Protestant churches
—the forms of worship and the requirements of the congre-
gations are so changed. In Pugin it was consistent: in his
Protestant disciples it is absurd.

PUMA. [Lion.]

PUNISHMENTS. [OFFENCES AND PUNISHMENTS, S. 1.]

PUJAH, OR PUNJAH. [HINDUSTAN.]

PULI, OR THE ELEPHANT. [HINDUSTAN, S. 1.]

PUSEY, PHILIP, elder brother of the Rev. Edward
Bouverie Pusey, D.D., was born in 1799. Having succeeded
in 1829 to the Pusey estates in Berkshire (held originally by
the tenure of a horn, which has been in possession of the
family upwards of 800 years), he became member for the
borough of Chippenham in 1830, and in the following year
for that of Cashel. In December, 1834, he was elected for
Berkshire, for which he had been an unsuccessful candidate
two years previously; and he continued to represent that
county until the election of 1826. A Conservative in
politics, and a decided supporter of the Corn Laws, on finding
that agricultural protection, however desirable he might
deem it, was practically unattainable after the passing of the
Corn Law measures by Sir Robert Peel in 1846, he, instead
of continuing with the bulk of the Protectionist party to
agitate for a repeal of the free trade measures, urged the
agriculturists to make the best of their position, and to adopt
without delay every improvement which scientific investiga-
tion and practical experiment had shown to be beneficial, in
order to enable them to compete advantageously with the
foreign producer. Already well known as a practical agri-
culturist, and as one who had given his attention to, and
carefully watched and tested, every scientific improvement
which had of late years been suggested to him (the system of
drainage, ploughing, and reaping, his advice was listened
to with respect, and his various practical papers in the
'Agricultural Journal' were received as authoritative, and
probably the influence of his high character and sober
judgment may be attributed in no small measure the great
advance which has been made within the last few years in
every department of English agriculture. Mr. Pusey was
president of the Royal Agricultural Society of England in
1854, and one of the chief contributors to the Journal of that
society, which he also edited for several years. He died
July 6, 1855.

PYRAMIA. [Phthir. Practice of (Blood, Diseases of),
&c. 2

PYREN. [Chemistry, S. 1.]

PYROSKLERITE. [Mineralogy, S. 1.]

PYRRHITE. [Mineralogy, S. 1.]
Quatemère de Quincy occupied a prominent and influential place among the French writers on the history and theory of art. He outlined however his reputation as an archaeologist, for his learning was but shallow as compared with later scholars, especially those of Germany; and as a writer on the principles of art, he was a superficial writer than profound. Yet his work contains much valuable material, and his speculations are mostly interesting, however unsatisfactory. The following, in addition to those already named, are his principal works: - *Lettres Addressées à M. Canova sur les Marbres d'Egée*, *Svo. Roche-Quincieux, 1805,* *Histoire de la Nature, du Bât, et du Moyens de l'Umination dans les Beaux Arts,* *Svo.* 1833 - the most original and the most satisfactory of his speculative works; *Lives of Rafflesie* (1834), of the Most Celebrated Architects (1830), of Canova (1834), and of Michel Angelo (1850) *Svo.* and *Ouvrages des Antiques restitués d'après les Descriptions des Etrangers Grecs et Latins,* 2 *Svos.* 4to, 1829-37. Two of his works have been translated into English, *The Destruction of the Works of Art,* and the *Writings which they have applied with regard to their Influence on the Genius and Taste of Artists, and the Sentiments of Amateurs,* by Henry Thomson, 12mo, 1821; and the *Essay on Imagination in the Fine Arts,* by J. C. Kent, *Svo.* 1827.

QUEENSTOWN, or COVE OF CORK, County Cork, Ireland, a sea-port town, is situated on the south side of Great Island, in 51° 51' N. lat. 8° 18' W. long. distant by road 14 miles E.S.E. from Cork, and 167 miles from Dublin. The harbour was established in 1861, about 11,428. Previous to the French war Cove was a small village consisting of fishermen's cabins; it then rose into importance by becoming an admirals station. It was the port of embarkation for troops going on foreign service, and a place of rendezvous for merchant vessels about to sail under convoy. It now depends on the number of invalids who resort to it, especially in summer, when it is much frequented as a favourite bathing-place. The name was changed from Cove to Queenstown on the occasion of her Majesty's visit to Cork in 1850. The town, which occupies a steep acclivity over looking the harbour, consists of several streets rising one above another in lines parallel to the beach. It contains a handsome parish church, erected in 1812; a Roman Catholic chapel, which serves the priest of the diocese of Clonard and Ross; a Wesleyan Methodist chapel; national schools; a club-room; a literary society; a public library and reading-rooms. It has also a market-house, a fever hospital, dispensary, and laundry. That part, erected in 1868, forms a fine promenade, commanding a view of the magnificent harbour. The harbour of Cove is 3 miles long by 2 miles broad, with an entrance 2 miles long and 1 mile wide. It contains Spike Island, on which are artillery barracks and a depot for convicts; the small island of havellin, with the ordnance depot, and near it Rocky Island, with two powder-magazines cut out of the rock. Steamers ply daily in summer between Queenstown and Cork. The Royal Yacht Club of Cork holds its annual regatta in the harbour. Petty smuggling is still carried on. A market is held on Saturday, QUERCUS. *[Chemistry, S. 1.]* QUERCUS. *[Chemistry, S. 1.]* QUINCEY, DE. *[Quinçemer de Quincey, S. 2.*] QUINODINA. *[Chemistry, S. 1.]* QUINolin. *[Chemistry, S. 1.]* QUINOLEIN. *[Chemistry, S. 1.]* QUINQUINA, or QUINA, names given to the species of plants which are generally referred to the genus Cinchona, in the article *Cinchona.* The word *Cinchona* was first found in an account of the species of *Cinchona,* as recognised by botanists previous to the investigations of M. Weddell. This traveller dwelt in the Cinchona districts of the Andes during the 1830s and gave the above account of this subject, entitled *Histoire Naturelle des Quinquines.* In addition to a highly interesting account of the districts, M. Weddell gives a full description of the methods of preparing the Cinchona Bark by the natives, who live in the forests. By dwelling on the spot he was enabled to correct many that were erroneous with regard to the nature and character of the species used in medicine. He also discovered the real plant which yields the yellow-bark, that furnishes the greatest quantity of quinine. The following table from M. Weddell's work exhibits the names of Commercial Cinchona Barks, and the species from which they are believed to be obtained:

I. -GRAY CINCHONA BARKS.

§ 1. Loza Cinchona Barks. (Crown Bark, Angl.-China, Loxa, Kron China, Germ.)

Loxa Cinchona Bark, grey compact; *[Chemistry, Pav.*] C. ericoides, H. et B.

Loxa Cinchona Bark, brown compact; *[Chemistry, Pav.*] C. ericoides, H. et B.

Loxa Cinchona Bark, red chestnut; *[Chemistry, Pav.*] C. ericoides, H. et B.

Loxa Cinchona Bark, red fibrous of the King of Spain. (Quina Espoas, Pav. in collect., Lamb. Mus. Brit.)*

Loxa Cinchona Bark, yellow fibrous; *[Chemistry, Pav.*] C. macrolepis, Pav.

§ 2. Lima or Huanuco Cinchona Barks. (Silver Bark, Gray Bark, Angl.-China-Huanauc, Graue China, Germ.)

Lima Cinchona Bark, grey-brown; *[Chemistry, Pav.*] C. micrantha, Ruiz et Pav. or *

Lima Cinchona Bark, grey ordinary; *[Chemistry, Pav.*] C. micrantha, Ruiz et Pav.

Lima Cinchona Bark, white; *[Chemistry, Pav.*] C. micrantha, Ruiz et Pav.

Lima Cinchona Bark, very rugged, resembling the Calisaya Bark; *[Chemistry, Pav.*] C. micrantha, Ruiz et Pav.

Lima Cinchona Bark, red, of Juan or of Loxa; *[Chemistry, Pav.*]

II. -RED CINCHONA BARKS.

Red Cinchona Bark, becoming white in the air; *[Chemistry, Pav.*]

Red Cinchona Bark of Lima; *[Chemistry, Pav.*]

Red Cinchona Bark true, non-verrucous; *[Chemistry, Pav.*] C. micrantha, Ruiz et Pav.

Red Cinchona Bark, officinal; *[Chemistry, Pav.*]

Red Cinchona Bark true, verrucous; *[Chemistry, Pav.*]

Orange-Red Cinchona Bark, verrucous; *[Chemistry, Pav.*]

Pale-red Cinchona Bark, with a white surface; *[Chemistry, Pav.*]

Brown Carthagena Bark; *[Chemistry, Pav.*]

Red Carthagena Bark; *[Chemistry, Pav.*]

III. -YELLOW CINCHONA BARKS.

Yellow Cinchona Bark of the King of Spain (Carcassonne Armariel del Rey, Labuert).

Caliaya Cinchona Bark, or Royal Yellow Bark (Kings China, Germ.-Yellow Bark, Angl.-China Regia, Bergen)

Orange-Yellow Cinchona Bark; *[Chemistry, Pav.*]

Cinnamomum Bark, or Quinaequina, (Quina-canella), Light Caliaya; *[Chemistry, Pav.*]

Caracassena Clara-Amarilla, (Labuert). Pitya Cinchona Bark (Quinaquina de la Colombia, or Antioquia, Quina, Quinaquina, Caracassena Parida a la Caliaya, Labuert). *[Chemistry, Pav.*]

Caracassena Clara-Amarilla, (Labuert).

C. cinnamomum, Ruiz et Pav.

C. cinnamomum, Ruiz et Pav.

Coromomum, Ruiz et Pav.

Coromomum, Ruiz et Pav.

Coromomum, Ruiz et Pav.

Brown Carthagena Bark; *[Chemistry, Pav.*]

Red Carthagena Bark; *[Chemistry, Pav.*]

Yellow Carthagena Bark; *[Chemistry, Pav.*]

C. cinnamomum, (Labuert).

Brown Carthagena Bark; *[Chemistry, Pav.*]

Red Carthagena Bark; *[Chemistry, Pav.*]

Yellow Carthagena Bark; *[Chemistry, Pav.*]
We be, the or, from certain the be entirely smooth, cellular peculiar and but texture. The following remarks:—

2. Huamaliea Yellow Loosely short
3. White Cinchona Bark
4. White Cinchona Bark, ferrugi-
5. Cinchona Bark
6. Arica Cinchona Bark
7. Pale-Yellow Cartagena Cinchona Bark
8. Cinchona Bark
9. Alica Cinchona Bark
10. Yellow Orange Bark
11. Pitaya Cinchona Bark, or False Pitaya Cinchona Bark

The following, according to M. Guibourt, are the most active barks:

1. Calisaya Cinchona Bark
2. Yellow Orange Bark
3. Pitaya Bark
4. Yaucous True Red Bark
5. Von-Verrucosa True Red Cinchona Bark
6. Red Lima Bark
7. Gray Lima Bark
8. Verrucous White Huamaliea Bark

On the subject of distinguishing the various barks of commerce, M. Weddell points out the falsity of the present mode of distinguishing the sorts of bark by the color, red, yellow, and gray, as frequently the same barks at different ages have different colors. Having shown also the impossibility of a chemical classification, he proceeds to make the following remarks:—

"If a classification be absolutely needed, one which should be based on the anatomical structure of the bark would be found to be of far greater utility than either of the preceding, inasmuch as we shall find existing, even in the Cinchonas, a marked relation between the structural and chemical characters.

"The following are the data which my researches on the subject have furnished me with:—

1. If we take a small piece of the bark of C. esobrculata, we shall find that instead of these fibers of fibrous texture, which so well characterise the C. calisaya, the exterior almost presents a smooth surface of a cellular texture, similar to the inner surface of the bark or of the layer which is immediately in contact with the wood. The examination of a transverse section shows that the texture of the bark is homogeneous, and composed of lignous fibers of almost uniform thickness, uniformly dis- tributed in the midst of cellular tissue gorged with resinous matter, tissue which may be said to isolate each fiber, being interposed in thin layers between them. Finally, when these fibers are seen side by side and longitudinally, we find that they are short and fusiform, and that their cut extremities are not loosely attached to each other, and are sometimes completely separate, and appear to float in the midst of the cellular tissue which surrounds them.

2. If we take a similar piece of the bark of C. esobrculata, we shall find that instead of these fibers of fibrous texture, which so well characterise the C. calisaya, the exterior almost presents a smooth surface of a cellular texture, similar to the inner surface of the bark or of the layer which is immediately in contact with the wood. The examination of a transverse section shows that the fibers are more numerous than in the C. calisaya, especially towards the inner surface, and are found in numbers rapidly near the exterior, and the outermost layer is entirely without them. These fibers, if examined in a longitudinal section, will be found to be of nearly the same length of those of the C. calisaya, and their extremities are invariably attached to the other, their ends being by this means more elongated.

"If we study with equal attention the bark of C. pseudoboea, we shall there find a similar structure. The external surface somewhat resembles the preceding bark, with the exception of a slight whitish marking, formed by the continuity of the periderm, and scissions which may result from desication. The internal surface is fibrous, as in the preceding, but a transverse section shows that it is principally composed of cellular tissue, in which the fibers form but a small number of irregular and concentric series in the interior half of the bark; and that which is present in the greatest quantity is the size of these fibers, each one being three or four times as large as those of either of the former varieties; the result being that several of them are attached and united together in bundles, which may be fully proved by the examination of a longitudinal section of this bark.

"As may be perceived, we have only spoken of Cinchonas which have been deprived of their periderm, because it is in this state that they are now usually met with in commerce. If perchance they were used again to be used with their natural coating, it would afford additional means whereby to distinguish them, but would not in any way affect those of which we have just treated; for nothing would be easier than to remove the periderm and to expose the surface beneath. Be this as it may, the structure of all the Cinchonas barks more or less resemble one or other of the three types we have spoken of, and on this plan there might be formed, without much difficulty, a series of groups comprehending all the barks. The purpose however in noticing these peculiarities, has been to facilitate the comprehension of a very important fact in the diagnostical character of the different kinds of Cinchonas; that of the vast difference they present in their mode of fracture. However singular it may in the first instance appear to be, it is easy to prove that, to a certain extent, the chemical composition of the bark operated upon may be determined by its mode of fracture; or, more properly speaking, there exists a relation between the chem- ical and physical characters of the Cinchonas, this being constantly proved by a particular form of fracture: smooth or corky where it divides the tunic or cellular covering of the bark; fibrous, stringy, or woody in those cases where it has affected one or other of the three forms of liber before described. Another fact which is now fully proved is, that the bark containing the largest proportion of quinine is that of the C. calisaya; and experience has shown us, that after the C. calisaya, the barks possessing it in the greatest quantities are precisely those the structure of which most resembles this bark; for instance, those in which the periderm is reduced to a single liber by the successive exfoliation of the outer tunics, or at least by their adhesion to the fiber, the case of the Cinchonas C. peruviana and C. arica, in which we also have shown, to a certain extent, that the Gray Cinchonas (which we have generally found to be the young barks of other species) contain a larger proportion of cinchonine than of quinine; we also know that many old barks, which have retained the cellular coating they had when young, yield a proportionally larger quantity of cinchonine; from which circumstance we may conclude that quinine is contained in the liber, or, more correctly speaking, in the cellular tissue interposed between the fiber and the liber, and that the cinchonine is principally found in the tunic or cellular coating. As to the tannin, it is found in larger quantities in this latter part than in the fibers tunic—a fact which is easily determined with reference to the fresh bark where the external layers of the derm are more strata than the internal layers." ('Pharmaceutical Journal,' vol. ix.)

The following are the specific characters of the Cinchona calisaya:—Leaves oblong or lanceolate, obvolute, obtuse, toothed along the side; resemble those of the Cinchonas, but are more acuminate, rarely acuminate aristate, or polished, or pubescent beneath; scrobiculate in the axis of the veins; filaments usually shorter than one-half the length of the anthers; capsule ovate, scarcely equal in length to the flowers, frequently fringed, dentilicate at the margin. Of this there are two varieties.

1. C. C. vera. A tree with oblong-obovate or obvolute lanceolate leaves.
2. C. C. Joroppiana. A shrub with somewhat acute-oblong lanceolate or obvolute leaves.

Both varieties are natives of Bolivia and Southern Peru. ('Pharmaceutical Journal,' vol. ix.)
QUINTANA, MANUEL JOSÉ, a very eminent Spanish poet and patriot, remarkable for the depth of his feeling in both characters, and remarkable also for the strange vicissitudes of his long career, was descended from an Extremaduran family, the native of Madrid, where he was born on the 11th of April, 1772. He studied and took his degrees in canon and civil law at the University of Salamanca, where he became intimate with the poets Cienfuegos and Melendez, who introduced him to the friendship of Jovellanos (Jovellanos, the secretary of the Spanish ministry of the interior, and a representative of liberal ideas in Spain. Quintana was from the first distinguished for his spirit of manliness and independence, and when he commenced his career as an advocate at Madrid, his house, at which a party of literary people assembled, every visitor was received with the same politeness by all those who were opposed to the degrading policy of Godoy, the all-powerful favourite of the day; while the house of Moratin, the dramatic poet [Moratin], the other literary focus, was the resort of those who paid homage to the minister.

From about 1795 Quintana became known as a poet only second to his friend Melendez, and in almost every case the themes he selected were of a large and lofty character, and treated in a corresponding strain. One of the finest odes in the Spanish language is his 'To the Sea,' but at the same time to his twenty-sixth year without ever beholding the ocean, and in 1798 he was seized with so irresistible a longing to fill up the deficiency, that he made a journey from Madrid to Cadiz for that express purpose, wrote the ode, which is not now preserved. Still he would have been noticeable in any country, but it was particularly so in that country and age, for, as Alcalá Gallano remarks, in his excellent history of Spanish literature, traveling, except on business, was of no part in the habits of Spanish life. Many of Quintana's other odes are scarcely less admirable than this, and they constitute by far his best title to poetical fame. It may be remarked that the patriotism, which is the animating principle of almost every one of them, is not gross, but at the same time a narrow feeling. Two of these odes, which will be found translated into English in Kennedy's 'Modern Poets and Poets of Spain,' are on the introduction of vaccination into America by the Spaniards, and on the battle of Trafalgar. In the first he alludes to the creative discovery of Jenner, Quintana exclaims—

"The gift of the discovery is the gift Of chance; that let an Englishman enjoy, But let Spain show her noble, generous heart," etc.

by conveying it to her colonies, apparently forgetting that England imparted the discovery not only to her own colonies, but to all the rest of the world, with the exception of France, which had been the first nation to which it was given. In the ode on Trafalgar, the battle is represented throughout as between the English and Spaniards, the French not being even mentioned with a notice of the battle, and the poet appears to think, he says, of the sword, gun, and death of the brave memory of Nelson by saying, "As an Englishman, I abhor thee; but as a hero, I admire." These points are worthy of notice as characteristic not only of Quintana but of the majority of his countrymen. In dramatic poetry Quintana was far less successful than in lyric poetry. As early as in 1791 he had contended for a prize offered by the Spanish Academy for a poem on the 'Rules of the Drama' ('Las Reglas de la Drama'), and in this production he exhibited a decided bent for comedy, marked by unbounded admiration for Corneille and Molieres, makes but inkwarm mention of Lope, Calderon, and Moreto, and none whatever of Shakepspeare, though, probably in consequence of his friendship with Melendez, he had studied English. In his own tragedies, of which he gave two to the public, the same line of thought is apparent. One of them, "El Duque de Viseo" ('The Duke of Viseo'), acted in 1801, is acknowledged by the author to be founded on an English drama, which he had studied. The other is the 'Spectre de L'ace,' an episoden of the villain's dream, is evidently taken from the well-known dream of Oomk Lewin's 'Castle Spectre,' but in other respects the resemblance is very slight. The other tragedy, 'Felayo,' which is somewhat better, is not so very admirable, but has a few passages which are very remarkable, and reading like passages from the author's odes.

Up to the time of the French invasion in 1808, Quintana's position continued one of great prosperity. As an advocate in spite of his liberal opinions, he held several important offices, among others, those of fiscal agent of the junta of commerce, secretary of the department for the interpretation of foreign languages, and censors of the press. The great literature man his reputation was constantly increasing. He entered a periodical entitled 'Variedades,' which was considered the best of its time in Spain. In 1807 he issued the first volume of a prose work, "Vidas de Españoles célebres" ('Lives of Celebrated Spaniards'), which was much bought and read, and was going on to Gonzalo de Cordova, the Great Captain. In the following year he published in three volumes a selection of specimens of the best Castilian poetry from the time of Manrique de la Cerda to Moreto, to which he prefixed a short history of Castilian poetry, and a dissertation on the thing of the kind that had before appeared, and which was afterwards rendered into English by Wiffen as an introduction to his translation of 'Garciaco de la Vega.' This was in the year of the French invasion. That great event had a very different effect on the three friends, Cienfuegos, Melendez, and Quintana. Cienfuegos, seized by Murat, and sent a prisoner to the south of France, died of indignation at the treatment of his country and himself; Melendez passed over to the ranks of the insurgent Castilians, to which all the literary antagonists of the French by far the most active and the most dangerous. He was the author of most of the manifestos of the insurrectionary Junta, the fervid eloquence of which strengthened the party of the insurgents. Of documents of the first Cortes. His weekly periodical, 'El Semanario Patriotico,' was the leading organ of the patriotic party, and exercised great influence on the march of events, for Quintana was no less uncompromising an advocate of the national independence than the French invader. The six years of the war were the most glorious of his long life. They were followed by six years of imprisonment. The return of Ferdinand VII. was to Quintana, as to all Spaniards of the shades of the signal of ruin. His having been the advocate of the Cortes and of constitutional government was regarded as a crime that called for punishment. He was suddenly seized and thrown into the fortress of Pamplona, where he was left imprisoned with no hope or promise of release, debarred from all intercourse with his friends, and not allowed access to pen and ink. In this state of rigorous incarceration he remained till he was released by the outbreak of Riego's insurrection, on the 1st of January, 1820. He was then at once set at liberty, saw himself surrounded with popularity, restored to his old offices and honours, and was named president of the department of public instruction, but he was no longer the man he had been before his imprisonment. His depreciation of tyranny was still strong, and he endeavoured to bring about the continuance of the new order of things, and with guarded prudence he abstained from making himself conspicuous in the ranks of the liberal party. When the second French invasion overthrew the constitution, he received the reward of his resigned allegiance to the country, Spain, while his friends and companions took refuge in England and France. Commanded to leave the capital he retired to Cabeza del Buex, the town in Extremadura to which his ancestors belonged, and there lived in obscurity and absolute poverty for some years. In this retreat he composed a series of 'Letters to Lord Holland,' with whom he had become acquainted at Madrid, which contain an eloquent and touching vindication of the proceedings of the Cortes, which, as he THEREFORE, had been prohibited, and a vindication of the injuries with which they had been treated by England. These letters, the last of which bears date in 1824, were of course carefully concealed at the time they were written, and did not see the light till they appeared in a collected edition of Quintana's works in 1826. On the Victoria of Ferdinand's marriage to his third wife, Queen Maria Christina, in 1826, he sent an intimation to Quintana that he would be permitted to return to Madrid, if he would write an ode in praise of his new queen. The poet naturally hitherto been that he had never written a line in praise of the powers that were, and his friends were at once grieved and astonished to find that he complied. The poem was pronounced to be the best of all that were produced on the event, although it was not the first, and the worst Quintana had ever written. The poet returned to Madrid, was no longer regarded as inflexible, and found himself on the road to fortune. Soon after he was named a member of the committee of the Museum of Natural History.
RADETZKY DE RADETZ, FIELD - MARSHAL, COUNT JOSEPH, was born at the castle of Trahincze, in the Klatitzer district, in Bohemia, on the 2nd of No-

vember, 1763. He was the son of Count Polar Besehicz Radecky, and of the Baroness Maria Bebychyna. The family name was formerly spelt Hradecky. Having entered the army as cornet, in the 2nd Austrian Cuirassiers, in 1784, he became sub-lieutenant, February 3, 1787. In 1788 he served in the Turkish campaign under Marshal Lacy, and was raised to the rank of first lieutenant for his services at the siege of Belgrade. When the Austrian army entered France in 1793, Radecky, then a captain, was sent to the new scene of war; and he was present in all the Italian campaigns from 1795 to 1800, serving alternately under Beaulieu, Warmer, Alvinia, and Ghega. In the battle of Arcola, Rivoli, and Marengo. Meanwhile, in 1797, he was promoted to the rank of major, and in 1799 he became adjutant-general to Melas, who soon learned to appreciate his zeal and gallantry, and repeatedly mentioned his name in his despatches. For his gallant behaviour at the battles of Novi (May 15, 1799) and Marengo (June 14, 1800), he was created colonel, and appointed to command the Archduke Albert's cuirassiers, and received the order of Maria Theresa.

From the peace of Lunville, in 1801, to 1805, Colonel Radecky was not employed in the field; but at the latter period he was made major-general. During the contest at Aspern, May 21-22, 1809, when the place was six times retaken by the Austrians from the French, few officers contributed so much to the victory as Radecky. On the 1st of June he received the command of the 4th corps, with the rank of lieutenant-field-marshall. At the battle of Wagram, July 6, 1809, he commanded the Austrian cavalry. In the battle of Stockhorn, in August, he was killed to the order of Maria Theresa. From that period until the end of 1812 his services were employed at home in the war-office.

During the whole campaign of 1813, while the tide of war had turned against Napoleon I., Lieutenant-Field-Marshall Radecky acted as chief of the staff to Prince Schwarzenberg; and the Austrian commander attributed the victory of Kulm mainly to Radecky's skill and gallantry. But his services were not so conspicuous after the battle of Leipzig, October 18, 1813, the plan of which he drew up. As well known this decisive action was a succession of battles which lasted three days. The Emperor of Russia and the King of Prussia were present, and 1800 pieces of artillery thundered over the field. Although he had been nearly thirty years in the service, Radecky received his first wound at Leipzig. Throughout the campaign of 1814 within the French territory he was continually in action, and on the 6th of March
he entered Paris, riding by the side of the Emperor Alexander. Radetzky was appointed in 1828 Commander-General of the Italian troops of occupation in Lombardy, and in the following year, when he was forty-six years of service, he was created field-marshal.

But it was the Italian insurrection, in 1848, which first gave prominence to the name of Radetzky. As early as the year before, the Austrian government had prepared the way for the Piave affair, by desiring the Piedmontese to promote the emolulding irritation. Societies were formed to diffuse the secret spirit of revolt throughout the entire peninsula. In 1847, the movement was all but brought to a crisis, when Anziani claimed and enforced the right to place a Jacobin as mayor of Milan. The insurrection, however, to which Guard was constituted in every Italian state. Then came the revolution in Paris, in February 1848, followed by similar movements in Vienna and Berlin, which raised the spirit of insurrection to its height.

On the 18th of March 1848, barricades were erected in every street in Milan; the fighting lasted for three days; after which Marshal Radetzky drew his troops out of that city, and retreated to Verona. The Austrian army at that time amounted to about 200,000 men, and was scattered over an extensive line of operations. Consequently the insurrecte were at first triumphant; the tricolor flag appeared upon all the towers of Italy, except those of Verona, Mantua, Legnago, and Peschiera; and Charles Albert, King of Sardinia, despatched a number of general officers to the gallant contest which was maintained for five months. More than once the Austrian colours had to quit the field; but every time they retired in good order. At other times victory was on their side. At length, on August 4, 1848, Radetzky, after a series of successful attacks on the Italian posts, advanced against Milan, at the head of the Austrian army; the Milanese lost heart, and deposed the monarchical officers; and Charles Albert, urging them to defend the city, they held a council of war. An attempt was made to send to Marshal Radetzky, and the terms obtained were:

"that the Piedmontese army was to be withdrawn in two days from the Lombard territory; that the Austrians were to enter Milan on the 6th of August; and that the lives and property of the people were to be respected." The struggle was now virtually at an end. Radetzky's superior strategy, and the diation of his opponents, rendered it an easy task for him to break up the Sardinian forces, and he was again master of Milan. A deposition was sent to Marshal Radetzky, and the terms obtained were:

"that the Piedmontese army was to be withdrawn in two days from the Lombard territory; that the Austrians were to enter Milan on the 6th of August; and that the lives and property of the people were to be respected." The struggle was now virtually at an end. Radetzky's superior strategy, and the diation of his opponents, rendered it an easy task for him to break up the Sardinian forces, and he was again master of Milan. An attempt was made to send a letter to the Emperor, after a prolonged service of seventy-three years in the Austrian armies. He died Jan. 6, 1859, at Milan.

Marshal Radetzky married in 1798 the Countess Frances Strassoldo-Gräfenberg, by whom he has left a son and daughter.

RAFFLESIAE, a natural order of stemless leafless Parasitical Plants, consisting of flowers growing immediately from the surface of branches, and immersed among scales. The perianth is superior, with a 6-parted limb, thickened processes or calli either distinct or united into a ring being attached to the throat of the tube. The essential organs are combined in a column which adheres to the tube of the perianth. Anthers 3-celled, either distinct and opening by vertical slits, or combined together so as to become a multinucellar mass opening by a common pore. Ovary 1-celled; placenta parietal. Fruit indehiscent. The species are East Indian and South American plants, parasitic on the roots of trees. The flowers are large and brilliantly colored. Some of them are said to be stinky. Their perianth has a fungoid appearance.

Rafflesia Arnoldi, a Semutra parasite, is capable of containing 20 gallons of liquid. The flower is said to some have to weigh a weight of 14 lbs.

R. Patens is employed as a stinking and stytic in Java.
of the Duke of Wellington, by whom he left two daughters and an only son, Richard Henry Fitzroy, now second Lord Raglan, who was formerly in the civil service at Ceylon, and afterwards held the post of secretary to the King of Hanover. His eldest son, Lord Raglan, was killed in the first Punjab campaign, while serving on the staff of Lord Gough, in December 1845.

RAIANIA, a genus of Plants so called in honour of the great naturalist John Ray, is known by the staminiferous flowers, having bell-shaped perianth in six deep oblong pointed segments, most spreading in their upper part. Corolla none; stamens with six filaments, bitrate-shaped, shorter than the calyx; anthers simple. Pistillate flowers, the perianth, consisting in six deep segments, permanent, withering; corolla none; pistil with the stamens inferior, compressed, with a prominent border at one side, 3-angled; styles 3, the length of the calyx; stigma obtuse; capsule membranous, smooth, crowned by the calyx; two of the cells barren, almost obliterated, without wings; the third fertile, compressed, extended into a very large half-ovate membranous wing; seed solitary, nearly elliptical, compressed.

R. hastata, Halberd-Leaved Raiania, is found in the island of St. Domingo. The root is perennial, sometimes large and ovate, sometimes 4, or 5 inches long, and 3 inches thick, round at each end. Its substance resembles that of a radish without any internal fibres, and light brownish- or reddish-coloured. A little above the root, the flesh very white, tasting like a bean. The flowers small, white, in simple axillary drooping clusters.

R. cordata, Heart-Leaved Raiania, has ovate leaves somewhat heart-shaped at the base, 7-ribbed. It is a native of the West Indies, from whence it was sent to Kew Gardens in 1786, by Mr. Alexander Anderson. Plummer represents the habit of the root, stem, &c., much like the foregoing; but the leaves are regularly ovate, pointed, more or less heart-shaped at the base, and furnished with seven ribs continued from that part to the point. These ribs are connected by numerous transverse veins.

R. ovata, Ovate-Leaved Raiania; has ovate-pointed 3-ribbed leaves, smooth, lanceolate, 7-ribbed; the stem, slender, smooth, hairy, and hard shrubby stem, turning thread-shaped, sub-divided with slender smooth leafy branches. The leaves rather distant, stalked, smooth on both sides, pointed, entire, 3-ribbed, being ovate at the base. The flowers dioecious, the males in compound clusters, females in simple ones; all stalked and turned toward one side. Corolla very minute, yellowish-green in the male, reddish in the female blossom.

R. angustifolia, Narrow-Leaved Raiania, is a native of the west side of St. Domingo, where it climbs upon high trees, flowering in May.

R. quinata, Five-Leaved Umbellate Raiania, has five leaves on a common stalk. It was observed by Thunberg about Nagasaki, and in Japan, flowering in April and May. The leaves are large, handkerchief-shaped, evidently membrane, divided into slender leafy branches. Leaves several together, axillary, stalked, smooth. Flowers in umbels from the same buds as the leaves, on slender stalks, as long as the footstalks.

R. cephalophora, Six-Leaved Clustered Raiania. Leaves six, on a common stalk, oblong-acute. Flowers racemose. It is a native of the country of Fakonia, in Japan, among bushes, flowering in April. The stem is round, striated, smooth, climbing. The flowers in axillary racemes, clusters approximated. The calyx is crowned in having mostly six leaveslets on a stalk, which are acute, reticulated, with veins at the back, and larger than in that species. The flowers moreover grow in clusters, not in umbels.

R. MYLIOBADUS, or RAINEA, a sub-genus of the family of Plagiotomus, distinguished scarcely, of which the Common Ray is the type. The body of these fishes is horizontally flattened, and more or less discous; the dorsal fins are mostly placed on the tail; a peculiar cartilage, called naso-pectoral, arises from the body, extends towards, or meets the anterior part of the crest or pectoral fin; the branchial openings are inferior. This sub-order is divided into the following families or tribes.

1. Cephalophoredæ, Horned Rays. They have a muzzle distinguished by two horn-like processes; the mouth before or beneath very broad; teeth very small, in some wanting in upper jaw; tail as long or longer than body, with a back-fin and apical tooth. The genus Cephalophorus has large lateral eyes and a transverse mouth, with small teeth like a file.

C. Hornæ is the only species known in the European seas. A specimen of this fish was once taken on the southern coast of Ireland. It has been described by Mr. Risso as a species inhabiting the Great of Nice. It approaches the shore, and is most frequently taken in the month of July. In Italy the small ones are called Vachetta, and the larger ones Vaciola. It dies immediately on being taken out of the water. It is a bad fish, and in some classes of the fishing is not caught. They grow to a prodigious size. Risso records a male weighing 800 lbs. and a female weighing 1900 lbs.

2. Myllobatidæ, Eagle Rays. The head is partially dis- engaged from the pectoral; mouth transverse; teeth large and quadrangular; the trunk was 6 ft. long, with a back-fin on root and a serrated spine behind. The genus Myllobatis has flat teeth; the central plate much longer than those which are lateral; pectoral fins wing-like; the tail armed with a large spine, set behind, with a small spine, near the root. M. apus, the Whip Ray, the Eagle Ray, and the Mul- len. This fish, though rare, has been found on the British coasts. Dr. Johnston has described a specimen found at Berwick-upon-Tweed. It inhabits the Mediterranean, and has been taken as far south as Cape Horn.

3. Trygonidæ, the Sting Rays. The head is laterally is closed by the pectorals; the teeth transversely elliptical; the tail without any fin, or merely a low vertical conical hair, and wide and not more than the serrated spine.

The single Trygon has the characters of the family.

T. pastinaca, the Common Trygon, the Sting-Ray, the Fire Flaire, La Pastinique of the French, is an example of this family. It was well-known to the ancients, who entered- tained some notion with regard to the venom of the spine of these fish. It is not unfrequent on the British coasts. The powerful serrated spine on its tail is used as an organ of defence.


R. ovata, the Skates. The body is rhomboidal; tail depressed, slender, generally with a low terminal fin, and frequently with rows of small spines; skin smooth or with small curved prickles; teeth flat, pavement-like, and pointed at the base. The skate is very frequent in the North Sea, and has two small fins near the end of the tail; the eyes and temporal orifices are on the upper surface of the head; the nostril, mouth, and branchial apertures beneath.

The Skate is a very common fish from the British coasts, and some of the species are used as food. The young are dis- posed in a similar manner to the sharks, in their horno cases of a square form, with four projecting horns, giving them the form of a butcher's try. These cases are very fre- quently picked up by the seamen. In Cumberland they are called Skato- Barrows, on account of their form. As the young fish increases in size it at last separates the edges of the horny layers in which it is inclosed, and escapes into the ocean. The Skate are the British species of this genus; and the longer of these fish in the southern parts of the British islam is called the Fresh Water Skate. For the Southern skate is called the Fresh Water Skate.

R. macrura, the Long-Nosed Skate, remarkable for its long pointed nose.

R. oxyrhynchus, the Sharp-Nosed Ray, the White Skate, the Burton Skate.

R. intermedia, the Flapper-Skate. This species was first taken in the Frith of Forth by Dr. Parnell, and first described by him.

R. batra, the Skate, the Blue Skate, the Gray Skate, the Tinker, La Raie Gondre of the French. This is one of the commonest species in our coast. The preceding species as well as this, the Thornback, and the Homely, are all com- monly called Skate.

R. marginata, the Border Ray. It has been only occa- sionally taken in Great Britain.

R. microelata, the Small-Eyed, or Painted Ray. This is a rare species.

R. mirularia, the Homely, the Home, the Sand Ray, and Spotted Ray. It is one of the commonest species along the coast. With the Thornback it is the most common species found in the London market.

R. spinosa, the Sandy Ray, Raye Râpe of the French. It has been only occasionally taken in the British Islands.

R. yagaren, a species of the genera of Rays is known by its rough back. It is only occasionally taken in the British Islands.

R. clavata, the Thornback, the Rough Ray. This Ray is easily distinguished by the spineless rays with which it is covered. Its flesh is regarded as the finest of all the Rays. It is in the best condition for the table about November.
and the capacity of secretaries, engineers, store-keepers, station-masters, trainmen, engine-drivers, guards, porters, post-office clerks, railway inspectors, and others.

Railways in England are now as extensive, or nearly so, as turnpike roads; but foreign railways have assumed a position of so much importance as to claim the attention of the most废旧的 men. It is a question whether the United Kingdom of having eight or nine thousand miles of railway open, it is of yet more importance to society at large that the other countries of the civilized world should be similarly provided; that prejudices of race and of creed should be softened down by intercommunication; and that each country should benefit from the produce of the others by interchange. It is no inconceivable a fact in the world's history that the Magyars of Hungary, the Slavonian of the eastern Russian, and the Italian of the new kingdom of Italy, should now be travelling in the same way, with locomotives displaying the same kind of highly-financed mechanism, as the inhabitants of the more developed and commercial countries of Europe.

We have yet to see whether European railways will ever be at peace, though the idea was entertained for so long as this is not the case, a railway line must inevitably be a line of civilisation. It is a "great fact" that a man may now "book through" from London to so many continents, in spite of new monastic customs, customs, and national jealousies. And if, direct communication across the Atlantic, we watch the progress of American railways, we shall there be struck with the conquests over the barren wilderness made in a few short years.

In Europe, the British railway system is so far advanced, that the lead. King Leopold proposed to the Legislature, in 1833, the adoption of a government system of railways; and a law was passed in 1834 in conformity with the proposal. The plan comprised a trunk line from Ostend to Liège, with lateral branches to Antwerp and Brussels; and a line from Brussels to the French frontier at Quiervain, making a total of about 247 English miles; in 1837 further lines were sanctioned from Ghent to Cointy, Cointry to Tournay, Braine-le-Comte to Namur, and Landen to St. Trond—a further distance of 94 miles; these various lines were opened to Brussels in 1835, to Antwerp in 36, to Ghent in 37, to Ostend in 38, to Cointy in 39, to Trebiz in 40, to Mons in 41, to the French frontier in 42, and to the Prussian frontier in 45, by which time 736 miles of road had been completed, amounting to 15,600,000 francs, or about 12,600l. per mile, exclusive of stations and carrying stock, which raised the cost to 16,500l. per mile. The Belgian lines open in 1836 were, from Ostend to Brussels, 86 miles; from Brussels to the French frontier at Quiervain, 60 miles; and from Mons to Nevy, 9 miles; from Brussels, by Malines and Liège to Herbechela, where it joins the Prussian line to Aix-la-Chapelle, 96 miles; and from Landen to Maastricht, also joining the line to Aix-la-Chapelle, 36 miles; from Bruges to Poperinge, joining a line to Calais, 59 miles; from Brussels to Mouscron, connected with the line from Lille to Paris, 73 miles; from Brussels to Antwerp, 26 miles; from Ghent, through Bruges, 41 miles; from Ostend to Antwerp, 31 miles; from Brussels to Ypres, 66 miles; from the Aix-la-Chapelle line, 85 miles; from Brussels to Erquelinnes, the direct Paris line, 66 miles; from Brussels to Namur, by Braine-le-Comte and Charleroi, 68 miles; from Louvain to Charleroi; by Ypres, 41 miles; from Brussels to Namur, 39 miles; from Manage to Ypres, 25 miles; from Ypres to Mons, 16 miles; a total of 890 miles. The Great Luxembourgu line, of which only parts are completed, is to join the French railways at Metz, and then connect Belgium with the Holy Roman Empire. Bruges, Ypres, and Ostend, only open as far as Namur, though the works are nearly completed as far as Arlon. The Great Luxembourg line, when finished, will form an important link in the chain of communications from England to the centre and south-east of Europe.

The portion of this railway system near Liège required very heavy works; but the average character has been easier
than of English railways. One great cause for this has been, that Belgian railways cross common roads on a level much more frequently than those of France, and which many bridges and viaducts have been rendered unnecessary. Very few accidents seem to have resulted from this plan, partly because the speed of Belgian railways is less than that of English. With the addition of a few miles of branches, the total length of the Government railways is about 350 miles; these, down to 1845, had cost 6,359,611l., including all expenses and an efficient working stock, or about 18,000l. per mile. A more extended plan was for several years before other Belgian lines of railway have been planned and carried out (so far as they are yet completed) by joint-stock companies, under certain concessions from the State. Among these are the Namur and Liège, about 66 miles of main line, the Sambre and Meuse, 46 miles together; the West Flanders, 96 miles, to accommodate the province of that name; and probably one or two others. A glance at a map of Europe will show that the Belgian main line from Ostend to Liège forms part of the trunk route from London to Paris through the Rhine valley—the railway-bridge shall have been built by the Prussian Government across the Rhine at Cologne, this route will become still more important. From the circumstance here mentioned, the Belgian railways have a very important and international character.

The northern neighbours of Belgium, the Dutch, have hitherto been very modest in their railway enterprises. The principal towns of Holland happen to be packed together in a tolerably small space, and the deeper waters and the Zuyder Zee; and a railway connection between them has thus been easily established. From Rotterdam to the Hague; from The Hague to Leyden and Haarlem; from Haarlem to Amsterdam; thence to Utrecht and Arnhem; and from Rotterdam to Utrecht, are branches of a belt road in intimate communication. There are however but two railways that cross the frontier, one from Amsterdam by Rotterdam and Dordrecht, crossing the Maas by steamer from Dordrecht to Moerdijk, and by Breda to Antwerp; and from Amsterdam by Arnhem to Emmerich in the Prussian states, and thence to Cologne.

France allowed herself to be anticipated by Belgium in the adoption of the railway system. While the lines were being slowly opened from Malines as the eastern towns were doing nothing but watching hesitatingly the result of English enterprise. While this hesitation on the part of the Government yet continued, a joint-stock company was quietly formed in 1832 for the building of a little line from Paris to St. Germain; the necessary powers were obtained in 1836, and the line was finished and opened in 1837. In this last-named year a commission was appointed to suggest a plan for a system of railways; the commission made a report in 1838; but as the Government and the Chamber of Deputies could not agree whether the railways should be national property or joint-stock private property, the plan fell to the ground altogether. Two companies, however, came forward and offered to construct railways with their own capital—from Paris to Orleans and from Paris to Rennes—on certain favourable concessions being made to them by the Government. These lines were formed, under many financial difficulties, and were at length opened, in 1838 and 1839. The results of the whole system of French railways was matured. The system comprised seven trunk lines—the first directed upon the Belgian frontier; the second, upon one or more of the ports; the third, upon the ocean, by one or more of the western ports, the fourth, upon the Spanish frontier, by Bayonne; the fifth, upon the Spanish frontier, by Perpignan, passing through the centre of France; the sixth, upon the Mediterranean, by Marseilles and the seventh, upon the Rhine, by Nancy and Strasbourg. As a further addition to the existing lines of railways from Marseille—one to Toulouse and Bordeaux, and one to Lyon and the Rhine at Mulhouse. These were to be constructed at the expense of the State, of the department, and of a joint-stock companies, all contributing on certain prescribed terms. The law of 1836 has had to undergo many modifications, but the general outline of the Government plan has been adhered to.

In some cases, private enterprise has come to the aid of the Government in another way. Thus, two short lines of railway have been opened in France, from Arbois to Besançon, and from Orébro to Nora; the two not much exceeding 40 miles; but a prospectus has been issued relating to a Swedish company, whose operations will be sanctioned by the King, which will connect Stockholm with Göteborg, 350 miles in length, which will connect the Baltic with the German Ocean or North Sea. Norway, too, has made a beginning. An English company began the works on a line of railway from Christianshavn on the Hallsing-Sund, which is the shortest way to the coast; while Münster is in a lake connected with the extensive inland navigation of the eastern part of Norway.
sent this is only completed as far as Eidevold, a distance of 48 miles.

In the wide-spread region to which the general name of Germany is applied—extending as it does from the confines of Denmark in the north to those of Turkey in the south—from the spot where it meets the Rhine in the west, the construction of railways must necessarily be very unequally distributed, arising from the great diversities in population and commercial Industry. There is, however, coming into larger use the building of such lines as have been developed. Some of the railways have been constructed by the respective governments, and others by private companies. Nearly all the whole of those in the Austrian empire, in Bavaria, in Württemburg, in Hanover, in Brunswick, and in Hesse, have been constructed and the line extended by companies who in most cases have been redeemed or purchased by the state—so unwilling are most of the states to allow the control of locomotion to slip out of their hands. In Prussia, and in a few of the other states, the traffic has been abstained from any direct interference with the construction or working of the railways; it has rather lent a fostering hand to private companies, in cases where the traffic did not appear to be large enough to pay an adequate dividend on the outlay. In order to keep down the expenditure to a reasonable limit, all costly works are avoided unless absolutely necessary; hilly districts are traversed by steep inclines and numerous curves, instead of by costly tunnels, cuttings, viaducts, and embankments; inasmuch as a slower rate of speed is necessary in such countries as England renders such gradients and curves easily manageable.

Taking Germany in its widest sense, as including the Austrian empire as well as the various states north and west of it; there were completed and opened between 1841 and 1847 about 3930 miles, and by the end of 1849 about 4590 miles. At the last-named date there were also 800 miles more in progress of construction, and about 3100 miles either decided on or contemplated, but without having been begun. Of the 3930 miles completed and projected, about 8430 miles. Prussia, with the Rhine states, possesses the larger portion, forming a net-work connecting them with France, Belgium, Bavaria, Austria, and Russia, and they show a great superiority of commercial activity over that of the more widely extended empire of Austria with its dependencies. Berlin is now connected by railways with Dresden, Prague, Vienna, Cracow, and Warsaw, but of course much of the line is beyond her own dominions. The lines in Prussia, though numerous, are generally, from that district of the empire, not long in themselves, though forming links on far longer lines: the single exception is the line from Berlin to Danzig and Königsberg in East Prussia, 400 miles. Austria, on the contrary, has a few which run on at a great length, and are only beginning now to be opened, such as the railway from Vienna to Trieste, 363 miles; from Vienna to Ternava, 368 miles; and from Vienna to Dombra, 68 miles beyond Cracow, 326 miles. Vienna at present is only connected with the general German system by a line from the Danube to Trieste, opened the beginning of 1850, from Berlin to Vienna, 343 miles; with that from Berlin to Prague, 211 miles; with the line from Belgrade to Vienna, 74 in the 100. As the 3rd class fare is only about 2s. 6d. per mile, and the 1st class a fraction over 1s. 6d., the average fares paid by the whole of the passengers is within 1d. per mile.

In the vast Russian empire, the first attempt to obtain railways was made by offering great advantages to any capitalists who would establish companies for this purpose; they were to have a gratuitions grant of all the land necessary, and all the timber and raw material which they might find necessary, the state to take away all tolls, and also to guarantee a stock free of duty; they were guaranteed by the Emperor a minimum dividend of four per cent. on their capital; and the great land-owners offered the use of their rents in consideration of the railway. The most important of these railways is that from St. Petersburg to Moscow, of 400 miles in length. The next in importance, in so far as it will connect Russia with central Europe, is the St. Petersburg and Warsaw, about 680 miles. A good railway, worked by horses, about 100 miles in length, has been formed to connect the Don with the Volga. There is a railway from St. Petersburg through a place near it called Tzarasko-soleo to Louga, about 84 miles. This is a part of the Warsaw line. Tzarasko-soleo has a royal residence, and between it and St. Petersburg there is a busy traffic, somewhat akin to that of our Greenwich railway, or to the Varesilles railway near Paris. Southern Russia is to have a railway from Odessa to Kief, to be continued possibly, at some future time, to Moscow, and thus to form a connecting line from Berlin via Stettin and Gumbinnen to the Black Sea. There are also lines planned from St. Petersburg to Cronstadt, and St. Petersburg to Baltischport in Estonia. The railway from Warsaw to Cracow is open, as well as the line from Minsk to Moscow; but in the other districts mentioned above, the works, so far as commenced at all, are proceeding slowly.

Of the countries lying south of the Alps, and west of the Pyrenees, little can yet be expected in respect to railway construction. Italy, with the large extent of her empire, France, Switzerland, and Austria, and Switzerland itself being surrounded by the Alps. Nevertheless Switzerland has not been inactive to the subject. There are now open lines from Basel to Lucerne, from Basel to Waldshutt, from Berne to Argen, from Herrenzüchsee to Zürich, from Zürich to Davos, from Zürich to St. Johann, and thence to Geneva: lines are also open from Turin to Piemolo, 33 miles; from Turin to Cuneo, 55 miles; from Turin to Genoa, 103 miles; from Turin to Biella, 56 miles; from Novara, 60 miles; from Turin to Bologna, 56 miles; and from Alessandria to Arona, 30 miles. Lines from Genoa to Novara, 63 miles, with a branch of 8 miles to Vigevano. By reaching Milan, from whence this line is not far distant, a communication would be opened with Verona, Mantua, and Venice; and the completion of the line to Genoa, which involves expensive engineering difficulties, would open a communication with France by Lyon.

In Italy, distracted as it is by political disputes, and broken up into so many states, the progress of railway enterprises has been rather retarded. Nothing has been done towards establishing international railways from state to state; but each state, or at least three of them, have now short lines confined to their own territories. In Tuscany, there are lines from Leghorn to Pisa, Florence to Sienna, Pisa to Lucca, and Florence to Prato; and in Naples the lines extend from Naples to Capua, and from Naples to Caprasia; from Rome a line of 12 miles is open to Frascati, and some other works are in progress. In the Austrian empire, the construction of the line from Milan eastward by Treviglio and Brescia to Verona and Venice, 176 miles, with a branch to Mantua. This line also communicates northward by Monza with Cenontratta on the line of S. Giorgio, and thus is well known, is situated on a series of islands; and these islands are connected with the mainland by a viaduct of great magnitude: it is 15,000 feet long, and has 392 arches, the piers of which rest upon 80,000 larch piles, driven into the bed of the lagune or channel.
Spain and Portugal have always been much isolated from the rest of Europe by the formidable Pyrenean barrier; and, from various causes, they have been slow to adopt the canal and railway systems which have been so valuable to the rest of Europe. Now, however, a new era is beginning, for Madrid is connected with Albadete in Murcia, 174 miles, which is proposed to continue to Zaragoza and Alicante. The other lines are from Barcelona to Arentes del Mar; from Barcelona to Granellos; from Barcelona to Martorell; from Barcelona to Reus, approaching Santander on the French frontier; from Cadiz to Xeros (or Jerez) de la Frontera; and from Valencia to Alcudia; all of them short lines, the length of the longest, that from Barcelona to Alcudia, being only 54 miles. The first has but one railway, under 30 miles in length, from Lisbon to Vizartides.

The Mohammedan, imitating the European in so many things, is now imitating him in railway enterprise. The Port of Egypt, eager to do all that can be done for facilitating the overland route to India, is now having a railway constructed from Alexandria towards Cairo, to touch the Nile at a point which will get rid of the slow transit along the canal from Alexandria, and thence to extend to Cairo. The crossing of the desert itself to Suez, whether from Cairo or from some port in the Mediterranean, has been very simply accomplished for several years past; schemes for ship-canaís and for railways have been brought forward in considerable numbers in a region of great want, and there is not at the present time, so far as we are aware, any strong probability that either a canal or a railway over the Isthmus will be constructed.

In India itself much has been done, and much more is in progress. About 150 miles of railway have been opened for traffic, and 1100 are in progress, to connect it with Delhi. But the terminus at Delhi, in consequence of the recent rebellion in India, it now is said, to be changed, and that the railway is to be taken by Almasa to the Persian Gulf, where is to be made the capital of northern-western India. From Bombay lines are to run to Mizapor, where it will join the Calcutta line to Delhi, to Madras, and to Ahmedabad; on the first 40 miles, and on the second 71 miles, have been opened, but the line is in progress on both; and, on the other lines, on the two lines; on the third nothing is opened, but the earth-works are completed from Surat to Ahmedabad, 150 miles. From Madras a line is laid out to the western coast of the peninsula, of which 90 miles are open, and 300 are in progress; and from Madras to Bellary, 386 miles are in progress of construction. [Indian Empire, p. 320, S. 2.]

In the United States of America, as early as 1843, we have that the rails had been established for 1,676 miles, the railway constructed, belonging to 143 companies, an average of only 36 miles as the length of each railway. The railways were constructed, as in England, by joint-stock companies, and not by the State; and although each railway company was exclusively for local business, it nevertheless arose eight great trunk lines of communication, by junctions of various lines. American railways have been constructed very much more cheaply than those in England, partly because the legal and legislative expenses are extremely small, partly because the land is bought at a low price, partly because timber is very cheap, partly because no useless expenditure is bestowed upon splendid stations, and partly because the relatively low price of labor is not increased by the expense of capital or labor. The railways are worked with care.

The eight great arteries of communication were,—1st, parallel to the sea-coast, throughout the whole vast distance from New England to Florida; 2nd, east and west from Boston to Lake Erie; 3rd, New York to Lake Erie; 4th, Philadelphia to Lake Erie; 4th, Philadelphia to Pittsburg, over the Alleghany Mountains, and comprising a system of railways and canals; 6th, Baltimore to the Ohio; 7th, Charleston to Cincinnati, uniting the Atlantic with the Gulf; 8th, New York to St. Louis. All these routes were actually completed in 1843, but that suffi-
cient had been done to show that such routes would result from the united labors of many companies influenced pri-
marily by local motives. By 1849 the length in work had increased to 6500 miles. Although the total length inhabited and commercially active, were naturally those in which railways were formed earliest and in greatest number; but the system gradually extended to the vast agricultural districts of the west; inso much that by 1849 there were five short railways in the state of Mississippi, ten in Louisiana, and a few in Alabama, Illinois, Michigan, Indiana, and Ohio. Dr. Lardner describes the utter strangeness of the sights and sounds presented by this encroachment of civilisa-
tion on the wilds of the west, this conquest of the wilderness, over the forest and the prairie. "Traveling in the back woods of Mississippi, through native forests where, till within a few years, human foot never trod, through solitude the stillness of which was never broken even by the red man, I have often been struck with the oddity of the scene—of our way by an engine driven by an artisan from Liverpool, and whirled at the rate of twenty miles an hour by the highest re-
finements of the art of locomotion. It is not easy to describe the sight—Although we see the part of the deer start from its lair at the moment of the ponderous machine, and the appearance of the snake-like train which follows it."—Railway Economy.

Of the 6000 miles of railway at work in the United States in 1849, more than half were in New York, Pennsylvania, and the New England States. Of these, the most remarkable, perhaps, is that which traverses Pennsylvania from east to west, as part of the route from Philadelphia to Pittsburg. First there are 61 miles of rail from Philadelphia to Columbia on the Susquehanna. Then there are 172 miles of canal from Columbia to Holidaysburg, which bring the traveler to the eastern base of the Alleghany Mountains. Next is the Portage railway of 37 miles, from Holidaysburg on the Susquehanna to the Alleghany. Then, from Ocean to Lake Erie, this railway has to climb a height of 1398 feet, and then descend 1172 feet; the trains are drawn up to the summit level by stationary engines and ropes; different levels being reached, one by one, by the aid of separate engines and ropes. From Lake Erie the route is completed through thirteen tunnels, the longest of which is five miles, to Pittsburgh. This fourfold division of the route is not so troublesome as it would be in England; for by an ingenious contrivance, the canal-boats are made available for land travel, and connecting lines are made across the Alleghany Mountains. All the railways, whether main or branch, are in an extremely good state of repair. The Pennsylvania is the most celebrated, and is second in length only to our own. The New England lines are in a better state than those in our own country.

By about the middle of the year 1851, it was estimated that the railways in the United States were more than 10,000 miles in length, having cost about 67,000,000$, or about 12½ cents per mile. The total length of all the railways open was stated to be 11,600 miles, besides 11,200 in course of construction, making a total of little less than 33,000 miles. An estimate for 1853 gives 13,000 miles as the probable length in the early autumn of that year, and ten miles more than this by the end of the year. All these lines are worked for traffic. In 1854 there were 17,217 miles completed, and 19,582 miles in course of construction. Since that period there has been a large, and the chief lines undertaken have been in connection with those of Canada. In January 1857 there were open and in work 34,320 miles of railway in the United States, and a line of 40 miles in length from Aspinwall to Panama. Including Canada there were in January, 1858, 440 lines, but many of them form portions of larger railways.

The American railways have several advantages which, to our discredit, have not been introduced upon English lines. Whether the abandonment of all"classes" in railway carriages, the non-distinction into 1st, 2nd, and 3rd class—whether this be an advantage or not, each reader must deter-
mine for himself. We shall simply state, therefore, that each is the case in the United States, and that the passengers—though they have not all the cushioned luxuries of first-
class railway carriages, are more comfortable and more distant from each other than our second and third-class passengers. The following is the type of an American railway carriage. It is two or three times as long as a London omnibus, but much wider and higher; there are doors at each end, and a row of windows half way along; the seats are designed to be turned to end, wide enough for one person to walk; and on both sides of this passage are rows of seats, transverse to the length of the carriage, and each accommodating two persons. There are from fifteen to twenty of these seats on each side of the
avenue, thus affording accommodation for sixty or eighty persons in the carriage. The seats are cushioned; and their backs, consisting of a single padded board about six inches broad, are so supported that the passenger may at his pleasure turn them either way, so as to have either his face or his back to the engine, the carriage can be turned at each end of the carriage; and in winter there is a small stove in the middle, with a smoke-pipe projecting through the roof. Some of the carriages have a ladies' compartment at one end. If these very large and roomy carriages were set upon any sort of railroad, it would be impossible to work them over curves of any but very wide radius; the arrangement adopted is, however, one which renders them even more manageable than our shorter construction. The Hamilton and Windsor is the only railroad truck, on which it rests on a pivot; similar to the expedient by which the fore-wheels of an ordinary road-carriage sustain the perch. On a sharp curve, the front truck may be moving in one direction, and the hind truck in a direction a little inclined to it, while the body of the vehicle forms the chord of the arc or curve. These long-bodied carriages have much less dead weight per passenger than English railway carriages. In American towns, the locomotive depôts are always in the suburbs, but the passenger coaches, the carriages of the train, are being drawn from the suburbs to the centre by horses, along the level of the streets. It should be remembered, however, that in many cases they are laid down as single lines. We have described one of the road-carriages that has recently been introduced in the United States, to excavate tunnels through hard rock. So far as descriptions of it have yet reached this country, it appears as if it would be a very valuable engineering aid. The machine works horizontally, and a rapid revolving tool bores a hole horizontally in the rock, a few inches in diameter. An enormous vertical wheel, equal in diameter to the intended section of the tunnel, has cutters or tools projecting horizontally from its face. At night there is a good lamp at the center of the rock, concentric with the hole first bored. The central hole is then charged with gunpowder, and a blast loosens and shatters the huge mass of rock between the hole and the groove. If, as is alleged, this machine will tunnel ten feet per day, it will greatly expedite railroad works, and cheapen them also.

It is a grand achievement to have the means of locomotion brought to places which were so little time ago quite unknown and even non-existent. It is a great thing to have railways to the chair of the Bishop of London, and in 1816 he supplied the place of Guizot as lecturer on Modern History in the University of Paris. In 1815 appeared the work which first gained him a more than local celebrity, 'Histoire Critique de l'Établissement des Chemins de Fer dans la France Ancienne,' vol. 5vo. The following year he was made member of the Académie des Inscriptions, and one of the editors of the 'Journal des Savans;' and in 1816 he was appointed keeper of the medals, &c., in the Royal Library. His attention having been directed to modern Swiss history he, during the following years, took an active part in modern Swiss history he, during the following years, took numerous journeys in Switzerland, of which he published ample particulars under the title of 'Lettres sur la Suisse écrites en 1819-21,' 3 vols. 8vo, Paris, 1823-28, and 'Voyage Pittoresque dans la Vallée de Chamouni et autour du Mont Blanc,' 4to, 1826. His 'Histoire de la Révolution Helvétique de 1797 à 1803,' appeared in 1823. But whilst thus engaged on topography and modern history, he was still diligently prosecuting the study of classical antiquity, to which he had devoted himself. His journeys to Greece and Sicily, Italy, Germany, Holland, &c., in order to familiarise himself with particular localities and to examine the treasures collected in museums. In 1825 appeared his 'Antiquités Grecques du Boeotien et d'Olympos,' 4to. He had already come to be looked upon as the legitimate successor of Quatremère de Quincy, before the delivery of his lectures in 1826 on his appointment as professor of archaeology, which considerably added to his celebrity. These lectures were published under the title of 'Cours d'Archéologie,' and again in 1836.

From this time M. Raoul-Rochette was one of the most active and most widely known of the French writers on ancient art, communicating numerous papers to the Mémoires de l'Académie des Inscriptions, to the learned societies, and frequently appearing before the public in distinct works. In 1828 he published 'Monuments indéchiffrés figurés Grecques, Etrusques, et Romaines,'
RAUFS, CHRISTIAN, an eminent German sculptor, was born at Arolsen in the principality of Waldeck, on the 2d of January 1777. He early showed an aptness for art, and received instructions in it from the sculptor Professor Roth of Qurich, in Hesse. In the fourth year he was presented to an office in the court of the King of Prussia; but his spare hours were all devoted to art. He here secured the friendship of Count Sandrexy with whom he held a conversation as it were a tour through a part of France to Genoa, and thence to Rome. There with the advice and aid of William von Humboldt, then Prussian minister in that city, he devoted himself to the study of the antique, while he availed himself of the friendly instruction of the chief living sculptors, Canova and Thorwaldsen. After a due probation he produced several original works, among others, bassi-relievi of 'Hippolita and Phaedra,' a 'Mars and Venus' wounded by Diodames; a 'Child praying,' &c. But he began still more to distinguish himself in the line to which he had gone to give himself up. He executed portrait; besides abundant private patronage, he received from the King of Prussia commissions to execute a colossal bust of the King of Prussia, and a life-size bust of the queen; and a colossal statue of Caesar, &c. From a house in 1811 he was recalled to Berlin, to execute a monumental statue of the Queen Louise. His design was approved, and his health having failed, he was permitted to proceed to Carrara to complete the work, which he did in 1813, in a style that secured his reputation. He then went on to Rome, where he remained till 1822, when he returned to Berlin, where he afterwards resided. During his second residence in Rome, Ranch was chiefly engaged on busts and statues; he executed in marble, bronze, and terra cotta, the statues of the king himself, monumental statues of Generals Bulow and Schambhorst. By 1834 he had executed with his own hand seventy marble busts, twenty of them being of colossal size. Among the more important of his later works may be mentioned two colossal bronze statues of Field-Marshal Blucher; the first, representing the hero in vehement action, was erected with great solemnity at Breslau, July 9, 1837; the second, designed after Blucher's death, for the King of Prussia, represents the venerated monarch.

Another of his principal works is a seated bronze statue of Maximilian of Bavaria, erected in 1836 in Munich. The 'Victories' for the Walhalla, near Ratisbon, are also from his chisel. A well-known statue of Gótte, modelled from the fragments of a colossal statue in the Louvre by another sculptor, represents the great Bavarian empress. Statues in marble or bronze of Schiller, Schleiermacher, and others of his chief contemporaries, and of Luther, Albert Dürer, and other famous Germans of an older time, serve to show the high estimation in which his works are held by his countrymen; while bronze statues of two or three of the old Polish kings, which he executed for Count Raczyński, to be placed in Posen Cathedral, and a bas-relief erected at Dublin in memory of Miss Cooper, show that his ability was appreciated beyond Germany. The chief of his works is a colossal statue of Frederick the Great of Prussia, erected in the finest part of Berlin. This work, in the design of which Ranck was assisted by Professor Schinkel, the architect, and which called into exercise the resources of art, was executed in 1819 and 1822.

The general model was completed in 1839; the colossal model of the king was not however ready till 1842, and the statue was cast in 1846. Four more years were required for the execution of the bas-reliefs, and the statues of military commanders. The new palace of the prince, the Baron von Hardenberg, erected in the middle of the city, is, with the exception of the palace of Frederick the Great, the most imposing monument of modern art in Berlin.

Of this—perhaps the most elaborate monumental work of recent years—a small model may be seen in the Crystal Palace, Sydenham, as well as casts of the colossal equestrian statue of the king which crowns the monument, and which will be erected on the site of the old royal palace, on the first of August 1860, the anniversary of the battle of Jena and Auerstadt. The model is a copy of the statue of Frederick the Great sold to the city of Berlin in 1851. The original statue was ordered to be erected at Berlin in 1846. 

RAUPACH, ERNST BENJAMIN SALOMON, one of the most prolific of modern German dramatists, was born at the village of Sitzaupits, near Liegnits, in Silesia, on May 31, 1801. He resided for some time in Berlin, taking advantage of the political disunion of the state to visit the northern parts of Germany, and in 1801 proceeded to Halle to study theology. He afterwards went to Russia, where for ten years he occupied himself diligently as a teacher, and after a residence, in that capacity at St. Petersburg for a year and a half, he was appointed professor of philosophy in the University of Liegnitz, and in 1816 proceeded to Halle to study theology. He afterwards went to Russia, where for ten years he occupied himself diligently as a teacher, and after a residence, in that capacity at St. Petersburg for a year and a half, he was appointed professor of philosophy in the University of Liegnitz, and in 1816 proceeded to Halle to study theology. He afterwards went to Russia, where for ten years he occupied himself diligently as a teacher, and after a residence, in that capacity at St. Petersburg for a year and a half, he was appointed professor of philosophy in the University of Liegnitz, and in 1816 proceeded to Halle to study theology. He afterwards went to Russia, where for ten years he occupied himself diligently as a teacher, and after a residence, in that capacity at St. Petersburg for a year and a half, he was appointed professor of philosophy in the University of Liegnitz, and in 1816 proceeded to Halle to study theology. He afterwards went to Russia, where for ten years he occupied himself diligently as a teacher, and after a residence, in that capacity at St. Petersburg for a year and a half, he was appointed professor of philosophy in the University of Liegnitz, and in 1816 proceeded to Halle to study theology. He afterwards went to Russia, where for ten years he occupied himself diligently as a teacher, and after a residence, in that capacity at St. Petersburg for a year and a half, he was appointed professor of philosophy in the University of Liegnitz, and in 1816 proceeded to Halle to study theology. He afterwards went to Russia, where for ten years he occupied himself diligently as a teacher, and after a residence, in that capacity at St. Petersburg for a year and a half, he was appointed professor of philosophy in the University of Liegnitz, and in 1816 proceeded to Halle to study theology. He afterwards went to Russia, where for ten years he occupied himself diligently as a teacher, and after a residence, in that capacity at St. Petersburg for a year and a half, he was appointed professor of philosophy in the University of Liegnitz, and in 1816 proceeded to Halle to study theology. He afterwards went to Russia, where for ten years he occupied himself diligently as a teacher, and after a residence, in that capacity at St. Petersburg for a year and a half, he was appointed professor of philosophy in the University of Liegnitz, and in 1816 proceeded to Halle to study theology. He afterwards went to Russia, where for ten years he occupied himself diligently as a teacher, and after a residence, in that capacity at St. Petersburg for a year and a half, he was appointed professor of philosophy in the University of Liegnitz, and in 1816 proceeded to Halle to study theology. He afterwards went to Russia, where for ten years he occupied himself diligently as a teacher, and after a residence, in that capacity at St. Petersburg for a year and a half, he was appointed professor of philosophy in the University of Liegnitz, and in 836 Proceedings of the Royal Society. &c.

RAZOR-BILL. [Aux.]

RECEPTACLE, in Botany, is that part of the flower or which any of the other organs rest. It represents the a
termed as the stem and branches in their changed position. It assumes a variety of forms, and occurs very variously into the forms of flowers and fruits. [CALATHEIDUM; FLOWERS, S. 2; FRUIT, S. 2.]

RED-BREAT. [ENTHICA, S. 2.]

RED BREAD. [ENTHIACA, S. 2.]

RED SANDSTONE. The term Red Sandstone is more especially applied to two formations, the Old Red Sandstone (Oreo Red-Sandstones, S. 2) and the New Red Sandstone Rocks. The latter are also sometimes called Silurian, on account of the salt they contain, and they are also called Triassic.

It is in Cheshire and the southern part of Lancashire, and the northern part of Yorkshire, which together form an extensive and rich plain, watered by the Dee, the Mersey, and the Severn. The red sandstones are chiefly developed; and by a minute examination of these beds, and those of Warwickshire, the Silurian marls have been identified with the uppermost series of the foreign Triassic System. Throughout this cave the beds are nearly horizontal, the dip rarely exceeding two or three degrees, and being constantly towards the east, or a few degrees south or south of that point. They are, however, affected by some important faults. The whole district is covered generally by a mantle of clay, which is especially thick in Cheshire; and in that county also there occur extensive masses of rock-salt in a solid state, their total thickness amounting to not less than sixty feet. These alternate with beds of gypsum; with numerous bands of indurated sandstone and sandstone and sandstones, frequently marly, and of a red colour.

The red-marl district, with brine springs, is continued northward into Worcestershire, and northward into the valley of the Thames. The part of the formation extending also eastwards, occupying for the most part the plains through which the Humber and its tributaries make their way to the German Ocean. In Somersetshire and Devonshire similar sandstones occur, and lie unconformably, over-lapping the same, which must have been submerged against them, but uniformly composed of the same materials, remarkable throughout for the ochreous colour pervading them. Between Sidmouthe and Seaton, in Devonshire, the red marls contain gypsum in abundance; and near Teignmouth the cliffs, which are of considerable height, consist of alternations of argilloaceous beds of sandstone and conglomerate.

The beds which are lowest in position of the upper red sandstone, are chiefly found in the middle of England, and consist of thick masses of whitish soft sandstone. In some places (as in Staffordshire) these are surmounted by conglomerates, composed of rounded pebbles of quartz rocks, and other fragments, chiefly of Silurian rocks and old red-sandstones. The thickness of the formation is considerable, but has not been accurately calculated. It is only to be distinguished from the overlying silurian marls by small differences of mineral character. (Annot.)

The red sandstone system of rocks is one of the most varied and interesting we are acquainted with. There are peculiarities in its limestones, sandstones, and clays, as well as in its gypseous and salt deposits; the occurrence and nature of its organic contents, and the relation which it bears to other earlier and later classes of rocks, are worthy of careful study.

Sulphate of lime is found perhaps as frequently, and under almost as many curious circumstances in the stratiﬁed rocks, as carbonate of lime, in molasses aggregations, occasional prismatic prisms of calcite, and even as with the娟 (selinite), fibrous masses, and bands, and marmoloid or alabasterine rocks. It lies in strata of almost every age, and is not absent from diluvial, alluvial, and recent deposits. The mode of its occurrence is in a considerable degree analogous to that of the mineral itself. While long prismatic crystals appear in cavities of shells and in recent excavations (as in the gallery of Felling Colliery, Newcastle), the solitary broad ﬂaky crystals of selinite abounded in blue-clays of the tertiary and second period. The long prisms of iron, and the ﬂat gypseous marks, spots, and irregular lines in the red-clays (coloured by peroxide) of the Silurian System, the ﬁbres being (in agreement with a general law of structure) arranged so as to render them able to wound round the mass. The marmoloid texture is most commonly found in real however irregular beds, as at Moutounart, and is some points near Fairburn in Yorkshire, on the line of the York and North-Midland railway. At these places, ﬁbrous, marmoloid, and ﬂaky sulphate of lime may be obtained in association.

From what is known to take place at the present day, and from appearances in the distribution of the gyspum and selinite in masses of clay and cavities of shells, &c., it appears that the red sandstones have been at different periods subject to evaporation and may have given rise to deposits of rock-salt at various points. This has been shown to be the case at Peine, and at Teignmouth, and has probably been the case generally, particularly when the red-sandstones were subject to the action of salt solutions. The occurrence presents no particular difficulty.

Salt shows itself in the Cheshire mines as either granular, broadly laminated, or ﬁbrous; in great beds or minutely mixed with marls, nearly as gyspum is, and probably in regard to its origin, similar suppositions will apply, the solid beds (of limited extent, however, and irregular area) being due to a great evaporation of liquid over the previously deposited salts. That such water, in the case of rock-salt beds, is of organic nature, has been proved by the existence of organic remains in the new red-sandstones. The original masses during crystallisation presents no particular difficulty.

We ﬁnd, then, associated together, abundance of red-oxide of iron, salt, and gypsum, but few or no organic remains. The prevalence of red-oxide of iron in any of the strata is accompanied by a paucity or total absence of organic remains. In the new red-sandstones these red strata extend through several hundred feet of thickness, and it is found in general terms, that the types of organic life above and below are widely different. Similarly the thick series of old red-sandstones, which are divisible into two distinct groups of these productions. Some great physical changes must be supposed to have occurred previous to and during the saliferous period, and to have inﬂuenced both chemical and physical phenomena.

M. A. von Brongniart ("Prodrome d'une Histoire des Végétaux Fossiles," 1829), viewing the series of fossil plants, gives four great periods of ancient vegetation:—The ﬁrst extending from the earliest strata to the new red-sandstone strata; the second including these strata; the third including the ooliths and chalk; the fourth the tertiary strata. Of these the ﬂora of the second period (chiefly terrestrial) is very limited, and may be looked upon as a transition group of plants connecting the earlier and later periods. Similarly the series of marine foraminiferae which lie in the new red-sandstones have characters intermediate between the early (Paleozoic) and later races of pre-adamite life.

Although the fossils of this rock are but few, they are highly interesting. In amongst these rocks that we ﬁnd the ﬁrst traces of reptile industry, the ﬁrst chelonians, which was at ﬁrst called Chirotherium, is now known under the name of Labirynthodon. It belongs to the amphibious tribe of Reptiles. Footmarks of an extinct reptile have also been found in the red-sandstones of America, and described by Dr. Lea.

The equivalents of the British beds of new red-sandstone on the continent of Europe are—the Kamper Marls, or Marres Irrities, the Muschelkalk, and the Bunter Sandstein, or Grès Triasique, of France.
insurrection broke out in the Morea, Redschid served in the campaign under his patron. After the defeat of Pashas Ali, the Emperor of Soliman, he was made the private secretary in 1832. He now began his preparation for the higher offices of state by a series of foreign missions. In 1831 he was sent as envoy to Mehemet Ali, viceroy of Egypt, with the exception of a visit to the Christian and Jewish communities; and in 1833, he was in the following year raised to the dignity of Pasha. In the course of 1834 he was sent on a mission to the courts of London and Paris. Nearly two years were thus occupied, and the relations he formed with the English and French were so cordial that during his absence in England and France, became the basis of the credit and influence he obtained on his return to his native country. The great measure of Parliamentary Reform had recently become one of the most pressing objects of the government, and the subject was still fresh in men's minds. Redschid Pasha was particularly impressed with this great change, affected as it had been without reconces to violence. When he was recalled to his own court, the following year, to fill an important office in the administration of Pestier Pasha, his mind was occupied with the subject. Almost immediately after his arrival he found himself exposed to imminent danger by the death of the prime minister, who had been thrown over by an intrigue within the palace, and his downfall was increased by an attempt on his life. Each of his behaviour of Redschid Pasha was so circumspect as to baffie the designs of his enemies; whilst the credit he had obtained from his diplomatic missions was so high that he was created Grand Vizir in 1837. He did not however hold this position long. In the formation of his cabinet, Pestier Pasha, was passed to a Foreign Minister, and the practical knowledge and statesmanship which he had acquired in his European missions, are attributed to the systematic reforms which, under the name of the 'twenty years' have distinguished the reign of the present Sultan. Indeed, it is generally believed that from the accession of the young monarch in 1839 until the end of 1857, a period of nearly nineteen years, Redschid Pasha steadily pursued his object of introducing political reforms into Turkey, and that to him is mainly due the many great—however imperfect—social and religious as well as political improvements which have been effected in that country. But it was amidst much hostility and discontent that Redschid Pasha prosecuted his system of reform. In the late war with Russia he was called to direct the government, which through that difficult period he accomplished with signal ability. Though afterwards for a time displaced, he again became the actual head of the Turkish government, and the period during which he was in power produced to the statesmen gave him a strong hold on power. In private life he likewise, by example as well as otherwise, sought to modify the objectionable habits of his countrymen: he had but one wife; and he was said to have freed the corrupt practices commonly attributed to the higher official classes. He died on the 7th of January, 1855.

REED. [Phragmites.]

REFORMATORS. The establishment of new and the extension of existing Reformatory Schools have been provided for by the statute 20 & 21 Vict. c. 65; the previous statute 17 & 18 Vict. c. 36 having only provided for young criminals being sent to the schools which had theretofore been estab-

REGULUS. [Cockatrice.]

REGULUS, a genus of Birds belonging to the family Sylvidae. The genus is thus defined by Mr. Yarrell—Beak slender, straight, the edges dilated at the base, compressed towards the point; nostrils basal, lateral, oval, partly covered by small feathers directed forwards. Wings of moderate length; the first quill-feather very short; the second almost as long as the third, but the fourth much of the longest in the wing. Legs rather slender; feet short; toes four, the middle one and the outer toe joined at its base to the middle toe; claws curved and sharp. This is a three British species of the genus.

R. modestus, the Dalmatian Regular. This is a very rare species.

There are three other species natives of North America.

REED-DEER-MOSS. [Cladoonia, s. l.]

REPELASS FEVER. [Pattis, Practice or (Blood, Diseases of), s. 5]

RED. [Phragmites.]

REMORA. [Echeneis, s. 2.]

RENDELL, JAMES MEADOWS, a civil engineer of great eminence, was born in 1799, at a village on the borders of Dartmouth, in Devonshire. His father, Mr. Meadows, was a well-known architect, and his father, who was a man of ability, excellent common sense, and determination of character, qualities which de}-

R. modius, the Fire-Crested Regular, Fire-Crested Wren.

[Phraomitb.]

The young Mr. Rendel was employed on the survey and experiments for the proposed Suspension bridge over the Mersey at Man-

R. igniculus, the Fire-Crested Regular, Fire-Crested Warbler, or Kinglet.

This bridge, consisting of five elliptical arches, was, with the exception of that of Southwark, the largest cast-iron structure of the kind in the kingdom. Mr. Rendel was engaged in its construc-

tion from 1824 to 1837. For his account of this work he was awarded the Telford medal of the Institution of Civil Engineers. A description of the structure of these bridges, as well as of that over the Lary, was published in the Institution of Civil Engineers. The construction of the latter were also communicated by Mr. Rendel, in 1859, to the Plymouth Institution, of which he was a member, and pub-

lished in the following year in the only volume that has hitherto appeared of its 'Transactions.'

The repairs of the Montrose suspension bridge, after its fall, were confided to him, and he there introduced the system of importing that rigidity to the platform of the roadway which is now considered the essential part of such bridges. In 1833 Mr. Rendel removed to London, where he was soon consulted upon many important works, and was engaged in the chief parliamentary contests of that remarkable period in the history of engineering. About this time he designed the pier at Millbay, and he introduced the system of con-

struktion since employed with so much success at the harbours of Holyhead and Portland. Engagements promised in fast upon him, and his career was for the next few years one of quick succession of projects for docks and harbours, for wharves and docks, and the improvement of rivers and estuaries. In the year 1843, the projected construction of docks at Birken-}

head, in Cheshire, of such an extent as to create a formidable rival to Liverpool, brought him very prominently before the attention of the most important political institutions. He will long remembered in the history of parliamentary committees, for the ability with which he defended his positions; and the evidence given by him and other engineers, as now
collected, forms a valuable record of the state of engineering practice. The almost incessant labour, and the mental anxiety inseparable from this undertaking, were more than enough to exhaust his resources, and to exhaust support, and it is feared that they tended to shorten his life.

The daring project of constructing a dock at Great Grimsby, by projecting the works far out upon the mud-banks of the Humber, was next successfully accomplished; and he commenced the invaluable work which was to forge down his name to posterity besides those of Smeaton, Rennie, and Telford,—the harbours of refuge of Holyhead and Portland. Both these works were conceived with the largest views, and have been carried on with rapidity. In both cases the system was adopted of establishing timber stages over the line of the jettys and depositing the large and small stones together, as they came from the quarries, by dropping them vertically from railway wagons into their positions, thus being able to advance the work at a rapid pace. These two great works are advancing very satisfactorily; and it is worthy of remark, in evidence of the engineer's sagacity in the adoption of this system, although the severest storms which have repeatedly occurred on the exposed coasts where they are situated, have done some injury to portions of the stages, and of the temporary works, at Holyhead—where the piles were not shot with Mitchell's screws, which proved so successful at Portland—not a stone would appear to be dislodged, and the success of the system may be said to be complete, in spite of the sinister predictions which prevailed before it was tried. Among the other works upon which Mr. Rendel was engaged, should also be mentioned the constructions on the River Lea, and on the Chichester and the Arun canals. The former was employed by the Exchequer Loan Commissioners to report upon the drainage and other public works in Ireland.

He was less engaged in railways than hydraulic works; but in England he executed the Birkenhead, Lancashire, and Chichester Junction Line, and he had the direction of the 'East Indian' and the 'Madras' railways in India, the former projected by Mr. (now Sir Rowland) Macdonald Stevenson, as the first of the vast system now in progress, which on its completion will give to that country, the destined of our Indian Empire. The Ceylon line and that of Pernambuco in Brazil were also under his charge.

There was scarcely a harbour or a river of importance in the kingdom with which Mr. Rendel was not connected in some capacity. His advice was also sought by foreign countries; and he was engaged to report upon works for the Brazilian, the Prussian, and the Sardinian governments, and was nominated by the Viceroy of Egypt a member of the Imperial Egyptian Institution. The first step towards the construction of the proposed canal across the Isthmus of Suez.

In consequence of the danger which threatens the port, and therefore the city and republic, of Hamburg with ruin, from the rapid accumulation of sand in the bed of the Elbe, the navigation of that river was seriously interfered with, and the navigation of that river, and make proposals for averting the danger. A commission of such importance could not have been intrusted to more able hands. He spent some months in studying on the spot the nature of the difficulties to be overcome. Towards the end of the year he sent in a most able report, with a detailed account of his plan for remedying the navigation, and preventing any future recurrence of the deposit of sand and formation of a bar in the river. The report was printed and laid before the Bürgerschaft, or representative body of the citizens, but down to a very recent period the requisite works had not been commenced, or even determined upon, notwithstanding the rapid increase of the evil. Mr. Rendel proposed to construct a longitudinal dam or dyke in the middle of the Elbe, beginning at the island of Finkenwerder, a few miles below Hamburg, and extending down the stream for a distance of nearly forty miles. This would contract the main body of the river, and prevent the sand from spreading on the lower channel. The rush of the ebb and flood tides would not only sweep away the present sand-banks and other existing obstacles, but prevent them from ever forming again, deepen the channel, and canals, and increase the capacity of the water of the Elbe, allotted for the execution of this great work was seven years, and his estimate of the expense amounted to 8,800,000l.

In the words of the Proceedings of the Royal Society, from which, with some omissions and corrections, the present article is principally, though not wholly, derived, the subject of it "was a man of great energy, clear perception, and correct judgment; his practical knowledge was well directed, and he knew how to make good use of the scientific acquirements and skill of all whose services he engaged. His evidence to the committees was lucid and convincing, seldom failing in carrying the point. His reports on engineering works are distinguished by the clearness and correctness of his views, and the fearless expression of his opinion."

Mr. Rendel was a very early member of the Institution of Civil Engineers, having joined it in 1834. His professional character, administrative ability, and scientific knowledge, conspired to give him a seat in the council as Member and as Vice-President for the sixteen years preceding his death; and he was elected president in 1858.

He also became a Fellow of the Royal Society on the 23rd of February 1843; and, accordingly to the system which has of late prevailed of adding to the representatives of science in the council of the Royal Society of the English undertakings, during the years for which he was president of the Institution of Civil Engineers, he was also chosen upon the council of the Royal Society. Mr. Rendel was as amiable and kind in private life as he was energetic and firm in public, and his decease, which occurred on the 21st of November 1856, cast a gloom over the whole of the profession of which he was a brilliant ornament.

REPLEVIN. The proceedings in a replevin have been generally deemed the most summary of all the civil actions; and are perhaps the most widely used form of proceeding in our law for the preservation of rights. It may be most conveniently described by assuming a case under it, where a landlord is concerned, by the statute 19 & 20 Vict. c. 105. Replevins were previously granted by the sheriff's deputies; they are now effected by the registrars of the county courts. A bond is taken, as formerly, that the replevior shall bring an action within the time for the recovery of the property, or the court may decide for the landlord. The court may order the defendant to remove the cause from the tenant, but to lose his cause unless he proves that the title in dispute, or the rent or damage in respect of which the distress was taken exceeded 30l, in value. The statute is confined to replevins of distresses taken for rent, rentar or damage feasant; but the restriction is practically needless, for the other species of distresses known to the law have long been almost entirely obsolete.

REPRODUCTION OF PLANTS AND ANIMALS. The term Reproduction has been employed to denote those processes in organic beings by which the individual being is produced, developed, and maintained. It has thus been employed to express processes which are functionally distinct, and have very different ends in the economy of creation. The constant reproduction of the same tissues in the same part, is the means by which the form of the individual being is maintained during its life, and is the result of the ordinary processes of growth. The reproduction of all the species, or of the whole of the vegetable kingdom, the whole animal kingdom, or the whole of the being occurs. The power, however, of reproducing the same tissues, varies in different beings, and we find that although it is possessed even to the most insignificant individuals, the lower animals, no such power is possessed by the highest.

The term Reproduction has also been applied to the origination of the germ from which individual plants and animals grow. The process employed in the initiation of life seems to be essentially distinct from those engaged in carrying it on: hence the propriety of distinguishing in terms between that production of cells by which the life of the individual is maintained, and the arrangements by which its existence is prolonged to an individual. It has been proposed to restrict the term Generation to the latter process.

Although formerly great difficulties existed in distinguishing between these two processes from the want of sufficient observations, recent researches have allayed all that is necessary. In the ordinary reproduction of the tissues of plants and animals each cell has the power of producing other cells, or a large number of the same kind of cells are developed simultaneously, but in generation it is necessary that two cells come together. It is supposed that this process did not take place in the generation of the lower animals and plants, but recent investigations have shown that the natures of two cells is necessary to so produce a number of the lower plants and animals, that it is a fair inference that this process is distinct in the generation of organic beings. The two cells thus engaged have been called the germ-cell and the sperm-cell. The germ-cell is that in which the process of growth of the new being commences, while the sperm-cell which communicates the growing tendency to the other. These cells
are of different sizes and forms in the animal and vegetable kingdoms, and are placed in various positions in relation to one another in the same structure. But these characters are of necessity to be understood as indicating the action of some force which is very complex in its nature, and may be best comprehended by the use of the expression 'equivoc.' or 'spontaneous generation.'

The discovery of the necessity of the union of these two cells, for the production of a new being, has gone far to settle the question of 'equivoc.' or 'spontaneous generation.' Ever since the extended use of the microscope in the investigation of the structure of the organic beings, it has become more and more apparent that there was no basis for the supposed independent spontaneous generation of a preceding organism. The only cases in which it is now pretended that such an origin of organic life could take place, are those in which the minor forms of animal and vegetable life occur in insuffusions exposed to the atmosphere. But this occurs only in explaining the production of a new being, it is remarkable how exceedingly minute many of these organisms are, and that they are frequently produced from ova much smaller than themselves. Such organisms are easily taken up into the atmosphere, and can be thus conveyed from one spot to another. Such is the fact proved by the experiment of passing atmospheric air through red hot tubes or strong sulphuric acid, when it is found that water exposed to such air never affords any indications of the existence of organic beings. But water exposed to atmospheric air will, in a few hours, teem with living beings.

Although the subject of the generation of animals and plants has been regarded as a subject of much mystery, the facts which I have stated as well as others; have given rise to a branch of physiological inquiry. The greatest mystery is the mystery of all nature, and that is the reason of the assumption of a particular form by what appears to be the same combination of elements. No difference can be discerned between the cells of the Fowls of the same species, the oak and the apple, but the one always produce oak-trees, whilst the others always produce apple-trees. It is the same with the cells of animals, without the slightest appreciable external difference; but one set of cells will develop the form of one species of animal, and another set of another species; in this fact has led some inquirers to the assumption of the existence of a 'vital principle,' of a distinct and independent essence, giving to each species its definite form and character. There is no objection to such an hypothesis, provided it is not made use of to explain phenomena which are clearly under the influence of chemical and physical forces. As so much misunderstanding prevails with regard to the word 'vital principle,' it is better perhaps to discard it, and to speak of the limits of each species, and of each species of another species, under the control of a 'formative force.' This formative force being the ultimate fact in the history of each individual plant and animal, and regulating the chemical and physical processes, is usually called life, it has been proposed to call this a germ-force, or a germinal capacity; but as it is very clear that it is the same force that is in action to produce the whole life or growth of the plant or animal, there is no necessity for distinguishing its first effects, as observed in the act of generation.

In studying, then, the phenomena of generation, there are three conditions which have to be regarded.

Firstly, the Formative Force, which is peculiar in every species, and identical in all the generative cells produced in that species.

Secondly, the Physical Conditions in which the generative cells are placed. These are more especially heat and light, and the condition of the cell-membrane through which always passes a number of other forces.

Thirdly, the Elements which are supplied for the nourishment of the new being, and which by their Chemical Properties are capable of exercising an influence on the form and development of the plant or animal.

Each of these conditions is fixed exercising varying degrees of influence in plants and animals. Thus, amongst the lower forms of both the animal and vegetable kingdom, the formative force appears to exercise less influence than amongst the higher forms. This is seen in the difference of the same species of plant and animal assume under different circumstances. In fact, till very recently, many of the forms of Fungi, Algae, and Infusorial Animals, which had received different generic names, are now found to belong to the same species, and are produced as a kind of degenerate condition, produced by the influence of the third set of circumstances. The highest animals and plants are however liable to great modifications of the activity of the formative force by the operation of both physical and chemical circumstances. Loss of heat, the action of water, the exclusion of air, and the change of external temperature take place. Plants will not produce their leaves without the influence of light. Tadpoles are not developed into frogs and toads when deprived of light and heat. The disappearance of the green color in plants, the withering away of the flower, the decay of the animal is occasioned by the change of its food. The Brachiostoma of the sea-shore is converted into red and white cabbages, cauliflowers, and broccoli, by garden culture. All cultivated plants exhibit more or less modification of their growth under the influence of physiologic forces. The horse, the sheep, and himself, present varieties which, are manifestly dependent on external circumstances, and not on any change in the character of the formative or species-making force.

That there is no change in the character of this force is seen in the tendency which all the forms of a particular species have to revert to a definite type, or to cease to exist. This is seen especially in the case of cultivated plants and domesticated animals, which are subject to the greatest varieties of form, but which nevertheless retain through all, the evidence of a specific formative force. Thus, closely allied as are the species of apple and pear (the Pyrus malus and Pyrus pumila of botanists), and subject as they are to the same external influences, the apple has long been produced in Great Britain alone, there is not the slightest tendency in any of these cases towards confusing the specific character of the apple-tree and the pear-tree. Although we have seen that any number of species can even breed together, but the hybrid is not prolific, and there is no tendency on the part of the one species to degrade or develop into the other. All the facts that are known with regard to the nature of the formative force lead to the conclusion that it is one and the same, and not general, and that it is regulated by the same laws throughout all time.

In what is called the alternation of generations [Generation, Alternation of, S. 3], it might be supposed that an exception occurred to the ordinary process of generation. It will be seen, however, that the cases in which this phenomenon occurs, it results from modifications of the ordinary processes of reproduction, and the unusual disposition of the sperm-cells and germ-cells.

Having made these general remarks, we shall now proceed to speak more particularly of the process of generation as it occurs in plants and animals, restricting this term to the phenomena which take place as the result of the union of two cells. That reproduction in plants which occurs as the result of the growth of the same tissue from single cells, when it results in the production of a bud, is termed Gemmation or Sprouting. This kind of reproduction also takes place in the animal kingdom, and amongst many of the lower animals, there is no difficulty in the process of budding is seen. To this process of forming new beings as it were, from single cells, Professor Braun of Berlin has applied the term 'Verjungung,' which has been translated by Mr. Herford 'rejuvenescence.'

Amongst plants the lowest position must be assigned to the families Diatomeae and Desmidieae, and it is amongst these that the most clear evidence has been obtained of the union of cells in order to the production of the zoospores from which the new being is developed. (Diatomaceae, S. 2; Diatomaceae, S. 3.) The union of two cells is also seen in a large number of Conformae, especially in the groups to which the Zygoplanea belong. (Zyzoplanea.)

Although amongst the Algae the production of spores can be traced to a certain number of species, between two cells, their multiplication more ordinarily takes place by means of zoospores or zoosporoid bodies, which are perfectly homologous with the buds or sprouts of the higher forms of plants.

In the Fungi we meet with a variety of reproductive organs. As these have been investigated very recently, we give the following extract from Dr. Sanderson's account of the vegetable ovum in the 'Cyclopedia of Anatomy and Physiology.'

The simplest form of reproductive organs in the Fungi are those in which the species occurs on a basis or baimium.

The right use of the term 'individual' in Natural History is a difficulty. If the term is restricted only to the direct produce of the germ-cell and not to any intermediate stage, it can hardly be objected to. If, on the contrary, it is understood to include the entire process of reproduction, and the different reproduction of the germ-cell, its use in natural history becomes a matter of doubt. In order to confine the term individual to such cases, it has been proposed to give the term 'spore' or 'zoospore' to the independent structures which result from spore-producing, germination, or spore spread.
This form of organ is best seen in Greater. The next form of reproductive organs in the *Fungi* is in the form of a vesicle or bag, which is called a theca, or ascus. "Of these, the first which we shall mention belong to a group of subter- ranean plants, of which the Truffle is the best known example. The receptacle of the *Fungi* consists of a fleshy mass, throughout which numerous sinuous cavities are interpersed. Each cavity is partly lined, partly filled with the theca and the cells upon which they are supported. This receptacle, like that of all other *Fungi* with which we are acquainted, consists of a number of separate cells which close together; and when it is in the form of a whitish mass, so that on section, we observe the whole to consist of two substances—the one transparent, of firm consistence, and of a dark-brown colour; the other white and opaque. The former, which corresponds to the partitions which, in the young state of the Truffle, separated the cavities, is continuous with the external tissue which composes the envelope or peridium, and constitutes the venas interna of Vittadini. The laminae which it forms consist of filaments running for the most part, parallel to each other. The central column being formed by the tube of the theca, which is composed of the tubular cells, which are given off in great numbers from the surfaces of the laminae. These tubes, which are the terminations of the filaments of which the laminae are composed, have a circular or oval diameter throughout, and divided at intervals by septa; others much shorter are dilated at their extremities, and contain spores (thecae). Each theca is an oblong vesicle, and contains two, three, or more spores, never more than eight spores, and these are produced, as it were, in the same, or sometimes warty epispshe, within which may be distinguished a smooth inner membrane, immediately enclosing the oogogenous contents.

The receptacles of *Fungi* are represented in their simplest form by the *Uredinae*, a family which has been studied by numerous observers on account of the destructive properties of the plants belonging to it. The mass which is formed by the growth of the reproductive organs of *Uredo* under the epidermis of the leaves of the plants upon which it grows or sometimes warty epispshe, within which may be distinguished a smooth inner membrane, immediately enclosing the oogogenous contents.

The next *Fungi* are the *Uredinae*, a family which has been studied by numerous observers on account of the destructive properties of the plants belonging to it. The mass which is formed by the growth of the reproductive organs of *Uredo* under the epidermis of the leaves of the plants upon which it grows or sometimes warty epispshe, within which may be distinguished a smooth inner membrane, immediately enclosing the oogogenous contents.

They are probably the enlarged extremities of the mycelium filaments, with which many of them can be distinctly traced to be connected. Towards the base of the cavity, the outer wall is produced and thickened, as mentioned in their general form, as well as in their relation to the mycelium. In these however the membrane is produced inferiorly, so as to form a tubular pedicle; while in the club-shaped upper extremity it is lined by a considerable deposit of granular protoplast, so that here the mycelium is very much smaller than that of the external membrane. It is in this cavity that the spores are formed, at first not exceeding it in size, but afterwards increasing at the expense of the protoplasm, so as almost to fill the theca. In other genera, as in *Peronosporae*, the protoplasts are pedicellated cells of a similar form and originating in a similar manner, which, however, instead of one spore, develop another in their interior; these spores are arranged in linear series, and are formed in a single cap, which appears completely, but remains as a more or less consistent membrane, giving the spore to the spore-case which encloses it. Some of the *Uredinae* possess a cyst which remains as the peribacterium of the *Sphaeriae*, to which these are evidently closely related. The cyst is formed (Celidium) of a single layer of roundish cells.

From the *Uredinae* we pass by a natural transition to the *Discomycetes* and *Pyrenomycetes*. These plants have been investigated by Messrs. Fries and Sprengel, who have shown that they possess the closest relationship not only to the Lichens but to the most simple thread *Fungi*. The very remarkable facts which these observers have discovered, render the study of these plants more satisfactory and interesting. They have described a series of *Sphaeriae*, which are sometimes cysts, and which enclose the spores. The *Pyrenomycetes* are represented by *Sphaeria*, the receptacle of which consists, as is well known, of a spherical cyst, which is open above. Its wall is frequently prolonged

upwards into a tabular beak, which projects beyond the surface of the bark or wood in which the whole plant is imbedded. The membrane of the cyst (peribacterium) is usually composed of polygonal tabular cells; it is lined by an inner layer, formed of the commencement of the paraphyses and the stellate spores, and is generally connected. The theca are oblate cells, and the membrane of which is of extreme delicacy. When fully formed, they contain from three to eight oval spores, the episphe of which are in the early condition delicate and pallid, but by degrees become more or less pigmented; the outer portion, as is observed throughout the higher *Fungi*, consists of fluid loaded with oily granules. The spores are arranged with their long axes perpendicular to the inner surface of the theca, and are enclosed in the operculum, and are separated, instead of a larger number of algal cylindrical paraphyses. The whole peribacterium is usually enveloped in the filamentous stroma or mycelium, from which it takes its origin. The *Discomycetes* are represented by the *Pezicse*; between these and the *Sphaeriae* there are differences of external form, which, though they strike the superficial observer as important, are in reality trivial. While the receptacle of the *Sphaeria* is a cyst with an apical aperture, that of the *Pezicse* is a cup-shaped disc, the concave surface of which efforts upward, terminating in a cysl, the internal diameter of which is completely, or nearly so, surrounded by the external theca, which resembles in every respect that of a *Sphaeria*.

Along with the *Pezicse* and *Sphaeriae*, and those allied genera which resemble them in producing their spores in clusters, and which we may call *Pyrenomycetes*, are the *Discomycetes*, which, while they resemble those last named in the general outline and structure of their receptacles, differ from them completely in the mode of origin of the spores. The simultaneous occurrence of some of these genera along with their respective allomorphic analogues, or, in other instances, the successive development of both kinds of receptacles in the same position, had been frequently observed, and had given rise in the minds of some mycologists to the idea that the relation more close than was generally admitted. This suspicion did not, however, take a sufficiently distinct form to lead to observation, until the Messrs. Tulane, in a series of researches scarcely completed, showed that the genera in question, hitherto considered as distinct, were in fact identical, and that receptacles containing thecae and paraphyses, are produced on the same stroma, or, in other words, on the same individual plant, as those which contain aerogenous spores.

The earliest researches of Messrs. Tulane were directed to the *Pyrenomycetes*. In some species of *Sphaeria*, they found not only that the same stroma produces receptacles with aerogenous spores, which is followed by others bearing a member of a very different order of the plant, but occasionally to a stroma which is capable of rising to spore-bearing organs of a much simpler character; namely, branching filamentous pedicels, bearing at their terminations single spores, and rising directly from the mycelium filaments, with which they are continuous. In this condition the plant cannot be distinguished from a thread fungus, and has been hitherto described as such.

"The later observations of Messrs. Tulane, which are much more in detail, refer almost entirely to *Discomycetes*. In a species of *Rhizina*, a genus of *Discomycetes*, which inhabits the epidermis of many plants, the stroma at first presents the appearance of a black spot of various extent on the surface of the leaf. In the substance of this stroma the first receptacles are formed; they are cushion-like, as they grow, and are gradually connected with each other to form a number. As this process continues, the membranous thecae, and are entirely occupied by a pulpy nucleus, which consists of slender branched filaments, often so long as to project considerably beyond the apertures. These filaments bear at their extremities innumerable minute linear spores, which are enclosed in a abundant mucilage, and are expelled from the ripe capsules in the form of a long cirrhus. After the capsules, which are developed during the early summer months, have discharged their spores, the *Rhizina* is reduced to a perfect *Rhizina*. These do not arrive at maturity until the following spring, and bear upon their upper surface thecae and paraphyses, like those of a *Pezicse*. In other genera M. Tulane found that the ascohosphorous receptacles are covered by a sort of membrane, and that the spores described above mentioned, cylindrical spores of a much larger size, each of which is supported at the extremity of a pedicle of its own.
Thus in the plants under consideration we find that, without counting the organs produced by filaments, as directly from the stroma, there are no less than three varieties of spore-like structures, which can be easily distinguished from each other. All of these may be produced upon the same individual, and one is recorded in which all three varieties exist, and forms the normal theca, paraplasthies with innumerable slender linear spores at their extremities. As has been already hinted, the capsules which contain acrogenous spores, have been hitherto considered as belonging to genera distinct from those of the sperm-cells; and recent researches with which they were found associated. The genus Stypopora is characterised by a structure which completely with that of the capsules described above in Rhizomea, and other genera with similar relations, as being a sort of extension to the capsules, containing the larger variety of pedunculated cylindrical spores.

We know less of the reproductive organs of the Lichens, but they however closely resemble those of the Fungi. The following is a summary of the reproductive organs found in these two orders:—1. Sporules which are formed by the constitution and separation of the extremity of a simple cylindrical filament. 2. Spermatia, with their supporting pedicles. 3. Gametes (given to the style) Thecia, or ascus, and Basidia, with their suspensoria. Although the evidence is as yet imperfect, there is still good reason for supposing that the ascii and spermata are truly sperm-cells and germ-cells, whilst the other organs represent the germs or buds.

The reproductive organs of the Pteridophyta Cryptogamia is given under the articles Filicis, S. 2, and Musc. That the organs there described may be regarded as containing the two elementary cells, which we have called germ-cells and sperm-cells, is now matter of little speculation. Mr. Horace in a report, made to the British Association, in Oxford, 1861, says, in regard to the question of sexes,—

"We have several kinds of evidence:

1. The inferences to be deduced from the uniformity of the existence of two kinds of organs in connection with the reproductive process. We have seen that these exist in all the families at some period or other of the life of the representative of the species. In the Mosses and the Hepaticas they occur in the fully developed plant. In the Ferns and Equisetaceous they occur upon cellular structures of frondose character developed from all the spores, which frondose bodies or pro-embryos have an existence of some permanence, especially in the Equisetaceous. In the Lycopodioaceae, the Isoetaceae, and Rhiachoaceae, the pistillidia occur upon very transitory cellular structures developed from one kind of spore, the larger, whilst the smaller spores at once develop in their interior cells containing moving spiral filaments such as occur in the antheridia of the other families.

2. That we are deduced from the above observation on the development of those plants in which the two kinds of organs, occurring in distinct places, can be separated. Strong evidence has been brought forward that the dioscorous Mosses, as at least, do not produce sporangia when the pistillidia are kept apart from the antheridia by natural accident. The majority of observers state that the large spores of the Rhiachoaceae do not germinate if the small spores are all removed from contact with them; a few counter-statements have been found. Again, the majority of authors, and all the recent ones, state that only the large spores of the Lycopodiaceae and Isoetaceae produce new plants; whilst some older writers believed that they had seen sporangia in all species do so.

3. The direct observation of a process of fertilisation, of which we have only testimony from two authors, Suminaki and Mercklin, in reference to the Ferns alone; since the assertions of Schleiden in regard to the Rhiachoaceae have been demonstrated by Nageli, Hofmeister, and Meinert to have been based on very imperfect observations.

To the question as to the homologues of the organs in the higher Cryptogamia, Professor Hufnagel gives the following answer:

"In the Mosses and Hepaticas the pistillidia occur upon the plant when the vegetative structure is perfect, and the immediate product of the great cell is a sporangium. If a process of fertilisation take place here, we may regard the antheridia, stamens, as analogous to the anthers and pistils of flowering plants, the sporangia of their fruits; with Hofmeister we may regard the phenomenon as an instance of an 'alternation of generations,' where the sporangi-
This is the embryo. The prolonged part subsequently dies away.

The development of the pollen-cell is more uniform in the different families of plants. The part at first appears in the young flower-bud as a little cellular papilla. In process of time this papilla divides into two portions. These are the rudiments of the future loculi, or valves. In each half, a single axial vertical column of cells soon becomes distinguished by its greater size and granular contents. In each of these cells the nucleus disappears, and is replaced by two others; this being followed by a division of the cell-contents, which form the primordial circle, into a new cell round each nucleus. This process is repeated, and a mass of cells is thus formed which

**TABLE OF VIEW OF ANALOGIES IN THE DEVELOPMENT OF DIFFERENT CLASSES OF PLANTS**

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**Germination**

loses its spherical shape, and becomes elongated, forming the so-called pollen-tube. It is this tube which, passing down the style, becomes applied to the embryo, and is the cause of the development and growth of the embryo. A question has, however, arisen as to whether the pollen-tube acts dynamically upon the embryo, or becomes part and parcel of the new embryo. Granular contents of the pollen-tubes be followed into the ovule, it will be found that usually one, and rarely more penetrates the intercellular passages of the nucles and reaches the embryo-sac, which is being forced forward, is pressed and indented, and by its folding-in, forms the embryo in the first stage of its development. A log is thus formed consisting of a double membrane, the indented embryo-sac, and the membrane of the pollen-tube itself. Schleiden infers the identity of the embryo and the pollen-tube from the three following circumstances:—1. The constantly equal diameter of the pollen-tube when it is just within the ovule. 2. The invariable chemical similarity of their contents shown by the reaction produced by the application of acids, oil of sweet almonds, iodine, ethyllic acid, and alkalies. The general contents of the grain of pollen are starch, and this either proceeds unchanged downwards through the pollen-tube, or else passes along after being changed by a chemical vital process into a transversally divided, uncountable fluid, which becomes gradually more and more opaque; and is coagulable by the application of alcohol; out of this, by an organising process, the cells are produced which fill the ends of the pollen-tube, extending in Orchis Morio far beyond the ovule, and thus forming the parthenogamy of the embryo. 3. The identity of the embryo and the pollen-tube is further supported by the fact, that in such plants as bear several embryos, there is always precisely the same number of pollen-tubes present as we find embryos developed.
Those views of Schleiden, with his conclusion that the pollentube should be regarded rather as the representative of the female than of the male in the animal kingdom, have been adopted by Wyder of Berne and others.

On the other hand, observations were made by Mirbel, Mirbel and Spach, on another class of plants, in which they did not meet with the structure described by Schleiden, and consequently they object to the general application of his conclusions. They examined the development of the ovule of the family Loranthaceae, and found the ovule to consist of two very elongated, cylindrical, structures, resembling the true embryo-sac, but they found the commencement of the embryo, which they call the primary nitch, and which Schleiden described as the result of an involution of the sac, existing in the cavity of the nucleus sac, was also an embryo-sac, as described by Schleiden, existed in the embryo. They also found in other plants the primary nitch existing in the interior of the embryo-sac, and at a period anterior to the act of impregnation. They therefore conclude that the pollentube does not become the embryo, and that no involution of the embryo-sac takes place. Their conclusions are probably as much too general as those of Schleiden.

Mr. Griffiths, in a paper published in the 'Linnaean Transactions,' gives the result of a long series of investigations on the development of the ovum in the genera Santalum, Oryis, Loranthus, and Visetum. From his observations on these plants, which differ from those investigated by Schleiden, and Mirbel and Spach, he has arrived at conclusions that must have some way of being contested by other observers, and he carefully refrains from drawing an inference from the facts which he has observed that would apply to the whole vegetable kingdom. "The first process," he says, "is the formation of a sac, which is entered by the pollen-sac, and the absorption of the boyan (the pollentube) to the embryo-sac would, in Santalum, Oryis, Loranthus, and Visetum, appear to consist of the formation of cellular tissue. This may be applied, I believe, to most if not to all instances. This cellular tissue appears to have two different origins—one, and this is the earliest in development, being perhaps referable to the embryo-sac, while the other appears directly referable to the anterior ends of the pollentubes. Thus far he agrees with Schleiden, that the ovule is formed from the into the embryonal sac, and that the embryo is derived from its intuited extremity. His observations on Santalum and Loranthus confirming this fact, whilst Oryis is an exception confirmative of the rule. But none of my observations, says Mr. Griffiths, have tended to confirm Schleiden's idea of the infection of the embryonic-sac before the pollentube; and it appears to me sufficiently obvious, that if such were the case the cylindrical bag (the primary nitch of Mirbel), consisting of the ovule, the embryo in its first stage of development, would consist of that portion which is derived from the first, or outer, of the ordinary and unaffected membrane of the sac; the second, of its inflected portion; the third, that of the pollentube itself. He also expresses his conviction that in the earliest period of the plant's existence, Messrs. Mirbel and Spach is the sac of the embryo, which no doubt often and perhaps generally exists before fertilization.

Dr. Murr has published a paper in the same volume of the 'Linnaean Transactions.' He made a series of observations upon the ovum of the Tropoeolum majus. He concludes from his observations on the Tropoeolum majus, "that in this plant the primary ovule and the future embryo never exist together as a whole. They always consist of the pollentubes at their first origin, or at any subsequent period of their development, as is sufficiently obvious from the fact that the pollentube is never brought into contact with the embryo-sac. As the primary ovule makes its appearance before impregnation has occurred, it cannot be possible that the organ has ever formed the extremity of the pollentube, as is believed by Schleiden and Wyder. Moreover, as the primary ovule takes its origin wholly with the ovule-sac, and at the earliest period of its formation it is not in contact with any of the ovule-cells, it cannot have formed by the pollentube pressing before it a fold of the embryo-sac in its passage into the cavity of that structure, as Schleiden has maintained."

Our friend Dr. Richard Hull, in his 'Elements of Botanical History,' 1852, Professor Henfrey has published a paper on the Reproduction of the higher Cryptogamia and Phanerogamia, in which he states that he has not been able to observe the penetration of the pollentube into the embryo-sac.

We now pass to the consideration of the function of Reproduction amongst Animals. General Reproduction occurs in many of the lower animals in the same manner as plants. There is a common reproduction of destroyed tissue, which frequently extends to the production of an entire limb. This is seen amongst the Radiata, especially the Echinodermata, also amongst the Articulata. The highest families of animals in which this kind of reproduction occurs regularly are the Reptiles, in which instance the eggs or young animals are not destroyed. Observational instances occur in which the limbs of higher animals are reproduced. The case of a Thrush, in which such renewal had taken place in a leg, was brought before the British Association meeting at Hull. A case of this kind also occurred in a bird at the British Museum, having been removed, it was again reproduced almost entirely.

Reproduction by division into two, or by gemmation, the Filifarious and Gemmiparous methods of Reproduction, occur to a very considerable extent among the lower animals. These modes of reproduction do not occur alone, but both occur in the same families of animals. [Hydra, S. 2; Polyzoa, S. 9.] The individuals which are thus produced by fission or by gemmation are called Zooids. This process occurs in unicellular as well as multicellular plants and animals, and the single cells produced by the division of the Desmidieon, the Diatomaceae, and the Vorticelline, are as much entitled to the term Zooids as the more complicated forms of the Algae.

The true generative act is performed in animals in the same manner as in plants. In order to the production of the new individual it is necessary that there should be a union of germ-cells on the one hand with sperm-cells on the other. We shall not here attempt to describe the various forms of animals, in which this union occurs. The germ-cells are usually produced from tissues and organs that are structurally different, but as in plants these organs may be placed on different individuals, or on the same. When the two sets of cells are produced in the same individual, these cells are said to be Hermaphrodite; but if these cells are found on different individuals they are said to be Monosexual. The term hermaphrodite is also applied to plants; but when their sperm-cells and germ-cells are placed on different flowers, as happens sometimes in the Phanerogamia, they are called Monocious and Dioecious.

The sperm-cells in the animal kingdom assume a more definite form than those of the vegetable kingdom. In the higher Cryptogamia, where they assume the form of cell-like filaments, or cytoplasm, they never occur as sperm-cells in the animal kingdom. These filaments are formed in the interior of cells, from which they escape by bursting. They usually present an elongated filamentous appearance, with a slight club-like extremity. The spermatogenous tissue is therefore a kind of animalcule, and called spermatogenous, and are supposed to have an interior organisation. This is not the case, and they have no more claim to be regarded as animalcules than moveable blood-discs, or ciliated epithelium.

Dr. Murr has performed by these bodies are in many instances due to the presence of cilia, which are found upon their surface. The movements of such filaments would vary according to the disposition of the cilia. In other cases they present an elongated filamentous appearance, with a slight club-like extremity. At one time they were added as a kind of animalcule, and called spermatogenous, and were supposed to have an interior organisation. This is not the case, and they have no more claim to be regarded as animalcules than moveable blood-discs, or ciliated epithelium.

1. In the spermatic fluid, taken from the epididymis and vas deferens, motile spermatic filaments exist in very great abundance.

2. In more or less aqueous solutions of all innocuous indifferent substances and salts, the motion of the filaments ceased, and they form loops.

3. These filaments, thus furnished with loops, are not dead, as has hitherto been generally believed; for on the
19. The sperm-fluid dried in indifferent substances, and in saline solutions, may, in certain cases, have its motion restored by dilution with the same fluid, or with water.

20. The organs which give origin to the spermatic filaments are unpaired; they increase in size, and at last present a corpuscle (seminal corpuscle) in their interior. These corpuscles, as we have seen, are gradually converted into the spermatic filament, which is at first a very fine thread, and lies in contact with the inner surface of the wall of the corpuscle. The spermatic filaments usually present themselves in clusters, which arise from their tendency when set free to arrange themselves in this manner.

The size of the spermatic filaments varies. In human beings they are from 1-500th to 1-5000th of an inch in length. The head is about 1-5000th to 1-50000th of an inch long, and about half as broad.

In the females of most animals it is not difficult to find a large cell, which is called an ovum or egg. If this ovum be examined in the Mammalia, it will be found to present a vesicle, which is called the germinal vesicle, and this ovule presents a spot, called the germinal disk. There seems to be little doubt that this vesicle is really the ovum.

In the Mammalia the ovum is found in an organ called the ovary.

If the structure and formation of the human ovary be examined, we are led to believe that it is a very ancient organ, but especially during that period of life in which the power of conception exists, it will be found to contain, on an average, from fifteen to twenty small vesicles or membranous cases of various sizes; these have been already alluded to as the follicles of the ovary. This envelope or tunica is accurately described at their first formation, the Graafian vesicles are small, and deep-seated in the substance of the ovary; but as they increase in size, they make their way towards the surface, and when mature they form little prominences on the external surface of the ovary, covered only by the peritoneum. Each follicle is formed with an external membranous envelope composed of fine fibro-cellular tissue, and connected with the surrounding strata of the ovary by a network of blood-vessels. This envelope or tunica is lined with a layer of nucleated cells, forming a kind of epithelium or internal tunica, and named membrana granulosa. The cavity of the follicle is filled with a limpid fluid, in which microscopic granules float; and it contains also the ovum or ova. The ovum is a minute spherical body situated, in immature follicles, near their centre; but in those nearer maturity, in contact with the membrana granulosa, at that part of the follicle which forms a prominence on the surface of the ovary. These granules of the membrana granulosa are at that point more numerous than elsewhere, and are heaped around the ovum, forming a kind of granular zone, the discus proligerus.

In order to examine an ovum, one of the Graafian vesicles, it matters not whether it be small or large, to examine it when at maturity, should be pricked, and the contained fluid received upon a piece of glass. The ovum then, when found in the midst of the fluid by means of a simple lens, may be further examined with higher microscopic powers. Owing to its globular form, however, its structure cannot be seen until it is subjected to gentle pressure.

The human ovum is extremely small, measuring, according to Bischoff, from 1-240th to 1-130th of an inch. Its shape is very irregular: it is a discus proligerus of 1-5000th of an inch in thickness, which, under the microscope, appears as a bright ring, bounded externally and internally by a dark outline: it is called the zona pellicula, or vitelline membrane, and corresponds with the chorion of the impregnated ovum. It adheres especially to the heap of cells constituting the discus proligerus.

Within this transparent investment, or zona pellicula, and usually in close contact with it, is the yolk, or vitellus, which is composed of granules and globules of various sizes, but more especially those which are heaped around the ovum, which are the more numerous, resemble in their appearance, as well as their constant motion, pigment granules. The larger granules, or globules, which have a sapphirine-blue hue, are scattered in the periphery of the yolk. The number of the granules is, according to Bischoff, greatest in the ovum of carnivorous animals. In the human ovum their quantity is comparatively small.
The substance that combines the protuberances and granules of the yolk is in many animals quite fluid. The yolk then completely fills the cavity of the zona pellucida, and escapes in a liquid form when that membrane is ruptured: but in ova of the human subject, and some animals, the yolk is much more consistent, and sometimes escapes as a solid globule. The zona pellucida, according to Bischoff, solely owing to this firm consistence of the yolk that it in many cases preserves its form when a watery fluid passes by imitation through the zona pellucida, and that the sperm enters then between the yolk and that membrane.

From the appearances resulting from the action of water on the ovum, and from other circumstances, it has been thought that the mass comprising the yolk is surrounded by another membrane within the zona pellucida, but the evidence upon the point is not satisfactory. That is, in the yolk itself.

"In the substance of the yolk is imbedded the germinal vesicle, or vesicular germinaltv. This vesicle is of greatest relative size in the smallest ova, and is in them surrounded closely by the yolk, nearly in the centre of which it lies. During the development of the ovum the germinal vesicle increases in size much less rapidly than the yolk, and comes to be placed nearer to its surface. In a mature ovum of the rabbit it is about one-sixtieth of a line in diameter (Bischoff)." (Wagner.)

The act of fecundation is effected in the same manner in animals as in plants, that is, by the contact of the sperm-cells with the germ-cells. Much discussion has taken place as to whether the sperm-cells are fertilizing, as they are regarded as embracing the facts most generally accepted:—

As the germinal vesicle becomes fitted for fecundation, it loses its pellicular character, arising from the development of a large number of cells in its interior. It is at this period that the sperrmatic filaments, coming in contact with it, produce that tendency to growth which results in the formation of the new being.

The nature of this contact has been a question. Mr. Newport, however, in a series of very carefully-conducted experiments upon the Amphibia, comes to the conclusion that the spermatic filament penetrates the vitelline membrane, and comes directly in contact with the germinal vesicle. There is no special foramen for the admittance of the spermatic filaments, but they pierce through this membrane, and are first seen in the vesicle in the way of Mr. Newport found that a single spermatozoan did not produce fecundation, but that the penetration of several were required for its purpose.

The sperm-cells of birds and other animals are brought from the ovariess along the Fallopian tube into an organ called the uterus. It grows rapidly after reaching the uterus; it at first consists of two sacs, one including the other, and the inner containing a liquid. When it is about half a line in diameter a new element becomes visible: it is a delicate, opaque, granular disc, seen, with a dark spot in its centre, upon the surface of the internal globule or sac. This spot, which is seen either on or through the inner membrane of the ovum, corresponds with the cisticruncula of the egg, and is the first rudiment of the fetus.

In birds the cisticruncula, or germ-spot, lies upon the surface of the yolk: soon after the commencement of inhibition it extends and separates into two leaves; the latter is called by Pander the serous layer, and subsequently forms the osseous, nervous, muscular, and taumaturgic systems of the body; the inner, which is in contact with the yolk, is called the mucous; which (together with a third developed between them and the serous layer) appears to give rise, by the changes it undergoes, to the intestinal, respiratory, vascular, and glandular systems. The mucous layer of the germinal membrane gradually expands over the yolk, and nearly incloses it in a sac, which towards the body of the ovum thins into the integument, which extends the whole length of the embryo, and becomes the future alimentary tube. The sac containing the yolk, and communicating with the intestines, is called the intestinal vesicle, or yolk-bag, and towards the close of incubation is drawn into the belly of the chick, and its contents are used as nourishment. The lower end of the alimentary canal (the cloaca of birds) shoots out into a sac which is termed the allantois, or allantoic membrane. After a time arteries and veins are seen ramifying upon this sac. Whether it is a cylindrical tube, till at length it forms a double bag, laid immediately under the membrane of the shell. On this sac the blood-vessels are so distributed that their contents are influenced by the atmosphere through the osseous and vertebral membrane, and thus a true respiratory organ is established.

The original structure of the ovum, and the early development of the embryo, in Mammalia, appear to be much the same as in the egg of a bird; though there are some characteristics which are peculiar to that class. When an ovum of the human species is examined, the embryo is seen suspended in a loose bag filled with fluid, called the amnion, which is a sort of sac: this sac is the outermost product of the serous layer of the mist. In the formation of its formation a large part is reflected from the sides and extremities of the embryo (the reflection, according to Valpeau, not commencing before the twelfth day), so as to inclose a space behind it. As the walls of the trunk close in front, the circle at which the amnion is inclosed becomes attached to the inside of the sac, thus forming the chorion. The mucous layer of the germinal membrane, becoming attached to the outer layer of the amnion, is called the chorion, and is surrounded by a watery sac, as in birds, containing a yolk, or substance subservient to the nourishment of the fetus in its early stage. Whether this view of its formation and use he correct or not only rests on analogy; but in the early part of gestation, the outer amnion is sometimes seen as a tube, the cavity of which is lined with its covering, and the walls of which are thickened in the form of the intestine. In Mammalia it is in this circumstance that in the former it is not drawn into the body of the foetus, but remains without between the membranes, and gradually wasting becomes obliterated by the third month. The duct of the umbilical vesicle is accompanied along the cord by an artery and vein, which are called the omphalo-mesenteric vessels; the artery communicating with the superior mesenteric, and the vein with the vena porta. The allantois exists in all mammals as a tube in the hind part of the body, but is sometimes furnished with a placenta, which is not obvious. In some animals, as in man, it becomes obliterated at a very early period, as soon as the sixth week, but in others, as the Cervidae, &c., it is still traceable at the birth of the animal. The channel of communication between the allantois and the bladder, or cloaca (in birds), at first is short, so that the sac lies directly against the body of the embryo, but it afterwards becomes elongated, like the corresponding duct of the umbilical vesicle.

In man, after impregnation has taken place, a saccular membrane is formed on the inner surface of the uterus by an exudation of lymph. This membrane, called decidua, lines the whole of the uterus before the descent of the ovum; but when this passes down through the Fallopian tube it gradually passes the decidua, and reaching it in the cavity of the ovum, is supposed to be formed by the decidua reflexa; this grows with the ovum till it fills the cavity of the uterus, and comes in contact with the other portion called the decidua vera, lining the walls of the uterus.
membrana decidua, which is also thick and vascular. This thickening and vascularity of both these membranes gradu-
ally increases, and finally, after the umbilical portion of the cord is formed, the placenta is completely surrounded by the chorion, and is usually towards the fundus of the uterus; this thickened part is called the placenta. In ruminating animals the thickening and vascularity of the chorion is confined to a number of rather spongy elevations, varying in number from thirty to one hundred, and in height from 0.03 to 0.08 inches.

These vascular processes dip in between corresponding pro-
cesses attached to the uterus of the mother, which are called maternal cotyledons, the surface of which is supplied with numerous vessels, and in no way is it separated from the chorion by those of the fetus through the fine intervening membranes by which they are separated. In man the relation between the maternal and fetal systems is not so clearly understood as in the preceding instance. In the human subject the placenta is a spongy vascular mass like a cake, from six to eight inches in diameter, about an inch thick in the middle, and two or three lines at the circumference. It adheres by one surface to the uterus, and by the other is connected with the chorion, and the surface being lobulated, and is connected with the uterus by blood-vessels. The fetal surface is covered by the chorion and amnion, and presents the ramifications of the umbilical vessels, which consist of two arteries and a vein. The ramifications of the umbilical vessels are about two inches long, and no communication has ever been shown to exist between them and the utero-placental vessels; for if we inject from the umbilical arteries we find that the placenta is rendered turgid, and that vessels are found filled in every part of it, but between their ramifications there will remain an unin-
jected substance, and the uterine surface will not be injected, for the fetal vesseis do not pass all the way to that surface. In like manner, if we inject from the uterine vessels, the placenta will be filled, and relatively the same branch will pass into the fetal vessels. From this circumstance it is concluded that the placenta consists uniformly of two portions: the one is furnished by the deciduous coat of the uterus, the other by the vessels of the chorion, and these two portions may, during the first three months, be separated from each other by maceration. The structure of the fetal portion, so far as can be made out, appears to be similar to that of the pul-
monary vessels, the artery terminating in the vein. But the matter is by no means so simple as has been generally con-
cluded, as Mr. Hunter thought, to terminate in irregular cells, and the veins appear to com-
ence with open mouths from these cells, for by throwing wax in the uterine vessels we fill the cells, and frequently in the shape of miniature vesicles. It has always been considered doubtful whether the placen-
cal cells of Hunter were real or artificial, being, in the latter case, produced by extravasation of the injection; and recent researches have confirmed this doubt, but without throwing any satisfactory light on this very obscure subject. With regard to the use of the placentae we may infer that it is very similar in man to what it is in ruminating and other animals: it most probably serves to produce a change in the blood of the fetus analogous to that which the blood of the adult undergoes in the lungs; and, from considering that the fetus itself cannot create materials for its own growth and support, we may further infer that the placenta is the source of nutrition also.

The navel-string, or umbilical cord, which connects the child to the mother, is composed of the umbilical vein and two umbilical arteries twisted together, and surrounded by a gelatinous substance and the reflections of the chorion and amnion; it also contains the urachus, and the remains of the duct of the allantois. The umbilical artery and vein is at the same time the duct of the umbilicus; and in the same way the chorion, which is also reflected on the navel-string, is continued into the dermis, or true skin of the fetus.

The following is Valentin's account of the development of the principal organs of the human embryo.

"The primitive streak or groove is the first indication of the future embryo. It consists of a very small longitudinal groove in the middle of the upper surface of the serous membranes, composed of processes which are raised to form the laminae doraels. They grow over towards each other, meet in a longitudinal suture, and thus inclose a cavity, the primitive tube. Anteriorly this tube dilates into several vesicles, which lie behind each other, and in which is deposited a jelly-like substance. The spinal cord is laid down in its remaining cylindrical portion. The several parts of the brain of the human embryo gradually pass through numerous transitional forms, which correspond with their permanent parts. In this state the brain is analogous to a fruit in its embryo state, having a hard coat or shell, composed of a fibrous substance, and a jelly-like substance in its center. The brain is surrounded by a spongy substance, the gelatinous amnios; gelatinous amnios; the face, and the other portions of the body may be compared with vegetable matter in its embryonic state. In this condition the brain surface is covered with a jelly-like substance, which becomes the cerebral engine. The brain surface is composed of two layers of cells, which fill the cavities of the jelly-like substance, and are separated from each other by a jelly-like substance, which is the jelly-like substance of the cerebral engine. The brain surface is composed of two layers of cells, which fill the cavities of the jelly-like substance, and are separated from each other by a jelly-like substance, which is the jelly-like substance of the cerebral engine. The brain surface is composed of two layers of cells, which fill the cavities of the jelly-like substance, and are separated from each other by a jelly-like substance, which is the jelly-like substance of the cerebral engine. The brain surface is composed of two layers of cells, which fill the cavities of the jelly-like substance, and are separated from each other by a jelly-like substance, which is the jelly-like substance of the cerebral engine. The brain surface is composed of two layers of cells, which fill the cavities of the jelly-like substance, and are separated from each other by a jelly-like substance, which is the jelly-like substance of the cerebral engine. The brain surface is composed of two layers of cells, which fill the cavities of the jelly-like substance, and are separated from each other by a jelly-like substance, which is the jelly-like substance of the cerebral engine.
The pulmonary artery and vena cava of the new-born infant are connected with each other by means of the ductus arteriosus and venosus, respectively. The ductus arteriosus is situated at the first visceral arch. The external ear is produced last of all.

The organs of smell are also first indicated by vesicles, which are connected with the brain. The nose is developed after the external ear; it is a conical appendage, which is subsequently laid down, ends by separating the cavities of the nose and mouth. The tongue grows out of the first maxillary arch. The external integument is only separated into a sheet of skin of the body, which covers most of the body, and is capable of protecting it like an ointment from the injurious action of the liquor amni.
both systems of vessels. The purified blood is brought from the placenta by the umbilical vein, and is mixed before arriving at the heart with that which has been circulating through the fetus: the mixed blood is then transmitted by the sorts to various parts of the body; some of it only going again to the placenta by the umbilical arteries to be again purified.

The position of the child in the uterus is that which takes up the least room: it lies with the head downwards, the chin being bent on the breast; the knees are doubled up, and the arms are close against the body, the one across the body and the other between the head and legs. This is the most general position, and the child thus forms an oval figure, of which the head forms one end and the breech the other. The long axis of this ellipse measures in the ninth month fully ten inches, and the breadth five or six inches. The quantity of fluid which surrounds the child at the full time is, on an average, about two pints.

The ordinary period of utero-gestation in man is forty weeks, though labour often takes place before this period, or is delayed a little beyond it. The embryo having now arrived at a sufficient degree of maturity to exist separately, the fibres of the uterus contract, accompanied by contraction of the abdominal muscles and diaphragm. In consequence of these circumstances the fetal body, by a force from the womb; they then burst and evacuate the liquor amnii in which the pressure acts upon the child itself, which is gradually forced into the world, and commences a new existence. In man, and other Mammalia, the young being for a time in the abdomen, in which the length of the body is lost in the circumference of its nourishment, and generally requires a supply of warmth and a degree of protection till it is able to provide for itself.

RESPIRATION is that function in the animal kingdom by means of which the various tissues of the body are exposed to the chemical influence of the gases of the atmosphere, and the products thus formed expelled from the body. The advance of chemical knowledge has demonstrated that this function is one essentially of oxidation, and hence it has become the object of removal of the oxygen, and the retention of the carbonic acid and other gases of the lungs, gills, or sacs, are organs where the blood receives the oxygen gas, and gets rid of its carbonic acid; whilst the capillaries of the systemic circulation are the organs by which the oxygen is transmitted from the lungs to the body, and the carbonic acid. The process of respiration then is the same in the highest as in the lowest animals, with this exception, that in the lowest animals there are no organs of circulation, and no organs of ventilation, as the lungs and gills may be called, for carrying the oxygen and carbonic acid to and from the tissues.

The absorption of oxygen by the animal cell seems to affect three great objects:—1. The preparation of the materials taken up as food for the purposes of nutrition. 2. The production of heat, for the warm-blooded animals which have been supplied with oxygen, are said to be kept warm by this deprivation, but all; so that we find the amount of oxidation performed by this process becomes the exponent of the amount of vital activity displayed by any particular animal, or class of animals. When the functional activity of any animal is greater than that of another, the former will be found to contain more oxygen, and carbonic acid, than when it is small. Thus, in animals which hydrobates, the amount of oxygen consumed, and carbonic acid given out, is much less during their period of rest than when in the period of activity. Sluggish and slow-moving animals consume less oxygen than those which are active. Thus the Mollusca consume less oxygen than the various tribes of active insects. It is also found that animals whose movements are slow will support the absence of oxygen gas for a very much longer time than those whose movements are quick.

Under the head of the various articles devoted to the classes and families of animals some account is given of the general character and structure of what are called the Respiratory Organs, which convey the oxygen from the air to the whole surface of the animal exposed to the fluid in which they live, and which contains the oxygen necessary to produce the respiratory changes. When a number of cells are aggregated into a mass, as in the lungs or gills, the simple vessels are formed, special provision is made by means of cilia, or molecular movements, for carrying the fluid into these cavities, or tubes, as seen in many of the polygastric anaerobes and the sponges. Passing higher in the scale of animate beings we find the aquatic forms introducing water into the interior of the animal becoming more complicated, till in the Holothurian we find a special system of vessels for supplying this fluid, which have been called an 'aeriferous', or 'water vascular system,' and which becomes more fully developed in the Echinoderms, the lowest tribe of the Articulata.
These arrangements amongst the lower animals are preparatory to the two predominant forms of respiratory apparatus which are found in the higher animals. The provision for supplying the system with oxygen is in them made by means of a fluid carried, and which is a circulation of the apparatus to all parts of the body. This circulating apparatus brings the blood in contact with the air by one of two arrangements. Either the serous organ is a projection from the surface of the body, when it is called a Gill; or it is a depression in the surface, when it is called a Sac or Lung. The first of these arrangements is found in all animals which breathe through the agency of water, whilst the second is found in those which breathe air. In the Aquatic Mollusca, the Graparia, the Annelida, and the Crustacea, larva of insects, the fishes, the tadpole condition of the Amphibia, and the perennibranchiate forms of that family, we meet with a vast variety of forms of gills adapting these animals to lead an aquatic existence. On the other hand, we find in the Terrestrial Mollusca and the Insects the simplest forms of air-breathing apparatus; whilst in the Reptiles, the Birds, and Mammalia, we have varied forms of lungs.

Man breathes by means of lungs. The structure and arrangement of those organs, and the nature of the movements performed by the muscles which contribute to the performance of their peculiar function, are described under the article Lungs. The lungs of man are so constructed that they cannot be filled with water by the most violent efforts of the circulatory expansion, a certain quantity of air is taken into the lungs, and this act is called inspiration. This inspiration is followed by a corresponding collapse, during which the lungs occupy a smaller space, and a certain quantity of air is expelled—this is called expiration. The quantity of air taken in and that expelled by the human lungs at each respiratory effort varies. It is however easily measured by blowing into a vessel filled with water or other fluid, when the amount of fluid displaced will be the measure of the quantity of air thrown out from the lungs. Instruments of this kind, called spirometers, under the name of Spirometers, are now frequently employed as a means of diagnosis in diseases of the chest. The difficulty however of securing freedom from disturbing causes renders the spirometer less useful than the apparatus for expiration could be wished. The quantity of air thrown out from the lungs has been variously estimated, but probably from 20 to 25 cubic inches is near the truth. Scharling conducted a series of experiments upon the quantity of carbonic acid gas thrown out of the lungs by persons of different ages and various ages. The following table gives an idea of the average relations of the excretion of carbonic acid gas during one hour:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Age</th>
<th>Kilograms</th>
<th>Grammes</th>
<th>Grammes per inch of height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Man</td>
<td>35</td>
<td>55-50</td>
<td>33-530</td>
<td>0.3119</td>
</tr>
<tr>
<td>Youth</td>
<td>16</td>
<td>57-75</td>
<td>34-280</td>
<td>0.5867</td>
</tr>
<tr>
<td>Soldier</td>
<td>29</td>
<td>82-90</td>
<td>36-023</td>
<td>0.7946</td>
</tr>
<tr>
<td>Girl</td>
<td>17</td>
<td>55-75</td>
<td>25-342</td>
<td>0.4546</td>
</tr>
<tr>
<td>Boy</td>
<td>9</td>
<td>22-20</td>
<td>20,838</td>
<td>0.9245</td>
</tr>
<tr>
<td>Girl</td>
<td>10</td>
<td>23*0</td>
<td>19,102</td>
<td>0.8831</td>
</tr>
</tbody>
</table>

The air that is habitually and almost uniformly changed in breathing is by Mr. Hutchinson called Breathing Air. The oxygen is then certain that by means of the lungs, which may be expelled by a forcible and deeper expiration: this he terms Reserve Air. But even after the most violent expiratory efforts the lungs are not completely emptied; a certain quantity always remains in them, over which the spirometer gives no indication and which may be called Residual Air. Its amount depends in great measure on the absolute size of the chest, and has been variously estimated at from 40 to 260 cubic inches.

The greatest respiratory capacity of the chest is indicated by the quantity of air which a person can expel from his lungs by a forcible expiration after the deepest inspiration that he can make. Mr. Hutchinson names this the Vital Capacity; it expresses the power which a person has of breathing in the emergencies of active exercise, violence, and disease; and of a healthy man it varies according to stature, weight, and age.

"It is found by Mr. Hutchinson, from whom nearly all our information on this subject is derived, that at a temperature of 60° Fahr., 225 cubic inches is the average vital capacity of a man of 5 ft 6 inches in height. For every inch above height above this standard the capacity is increased on an average by 8 cubic inches; and for every inch below it is diminished to the same amount. This relation of capacity to height is quite just, and may be fairly attributed to the cavity of the chest; for the cubic contents of the chest do not always or even generally increase with the stature of the body, and a person of small absolute capacity of chest may have a large capacity of respiration, and vice versa. The capacity of respiration is determined only by the mobility of the walls of the chest; but why this mobility should increase in a definite ratio with the height of the body is yet unexplained, and must be difficult of solution, seeing that the height of the body is chiefly determined by the height of the leg, and not by that of the trunk or the depth of the chest. But the vast number of observations made by Mr. Hutchinson leave no doubt of the fact as stated above.

"The influence of weight on the capacity of respiration is less manifest and considerable than that of height; and it is difficult to arrive at any definite conclusions on this point, because the natural average weight of a healthy man in relation to stature has not yet been determined. As a general statement, however, it may be said that the capacity of respiration increases with age and weight. The experiments of Mr. Hutchinson on infant and on men of 5 feet 5 inches in stature showed that 10 cubic inches would be able to expire 217 cubic inches, one of the same height, weighing 12 lbs might expire only 303 cubic inches. By age the capacity appears to be increased from about the 15th to the 35th year, at the rate of five cubic inches a year, so that at 35 the capacity of a man of 5 feet 5 inches is 32 cubic inches greater than at 10. Again, the capacity decreases as the stature increases, so that the average of men of 6 feet can expire only about 1½ inches of mercury. The force manifested in the strongest expiratory act is, on the average, one-third greater than that exercised in inspiration; but this difference is in great measure due to the power exerted by the elastic reaction of the walls of the lungs, and it is also much influenced by the disproportions of strength which the expiratory muscles sustain through being called upon to act for other purposes than inspiration. The force of the inspiratory act is therefore better adapted than that of the expiratory for testing the muscular strength of the body.

"Much of the force exerted in inspiration is employed in overcoming the resistance offered by the elasticity of the walls of the chest and of the lungs. Mr. Hutchinson estimated the amount of this elastic resistance by observing the elevation of a column of mercury raised by the return air forced, after death, into the lungs, in quantity equal to the amount of air contained in the lungs, and which of necessity was the same as the air in the trachea. It was found that in a man capable of breathing 300 cubic inches of air, the muscular power expended upon the elasticity of the walls of the chest, in making the deepest inspiration, would be equal but for the use of force other than that of inspiration. At least, at a calm or tranquil respiration, supposing the amount of breathing air to be 20 cubic inches, the resistance of the walls of the chest would be equal to lifting more than 300 lbs. The elastic force exerted in ordinary expiration must therefore be much

* The kilogram is 2.205 lbs. very nearly. The gramme is 15.434 grains.

** The kilogram is 2.205 lbs. very nearly. The gramme is 15.434 grains.
it has been found that the carbon and hydrogen of nitrogenous foods become oxidised, and are given out during respiration, but they do not supply sufficient for the wants of the system, and when animals are fed on nitrogenised foods, the fat is oxidised and converted into carbonic acid and water.

It appears to be now an established fact, that the inhibition of spirituous drinks of all kinds is attended by a diminished excretion of carbonic acid. This was indicated by Prost and has since been confirmed by Vierordt and others. This shows the importance of such drinks in cases where the oxidating processes are proceeding too rapidly, and of their injurious tendency where these processes need to be stimulated. Dr. Prost observed that strong tea exercises the same influence on the system.

Sleep produces a very considerable diminution of the excretion of carbonic acid. Schaarling found that the ratio of carbonic acid exhaled during sleep in one hour in the night, to that eliminated in one hour in the day after dinner, was 31:39 to 40:74. A much greater difference is found between animals during their waking and hibernating states.

Bodily exercise increases the exhalation of carbonic acid, whilst rest diminishes it. Seguin, Prost, Vierordt, and Hoffman, have all proved this by experiment.

With regard to the quantity of oxygen consumed during respiration, it was at one time supposed to be exactly equal to the quantity of carbonic acid exhaled in the expired air. This however is not the case, for accurate experiments show that, after all allowance made for oxygen present in the tissues, there is constantly a small quantity more taken into the lungs than is thrown out. The destination of this oxygen is undoubtedly the oxidation of the carbonic acid gas excreted from the lungs, in the formation of the substances found in the bile and urine, and in the formation of phosphoric and sulphuric acids. The quantity of oxygen consumed is nevertheless measured by the carbonic acid thrown off from the lungs, so that, where there is an increase of excretion of carbonic acid, there is an increase of absorption of oxygen.

It is an interesting fact that small animals consume a relatively much greater proportion of oxygen than larger ones.

It also a fact of practical importance that the quantity of carbonic acid gas exhaled is not increased by increasing the quantity of oxygen in the atmosphere. As a proof of the necessity of the changes involved in the absorption of oxygen gas, it has been found that the eggs of birds, and undoubtedly this applies to the eggs of all animals, absorb oxygen and give out carbonic acid. The following table gives the result of some experiments of Valenciennes on this subject—

<table>
<thead>
<tr>
<th>Substance</th>
<th>Carboxylic Hydrogen</th>
<th>Oxygen</th>
<th>The quantity of Oxygen required for the formation of Carbonic Acid and Water in addition to the amount already present</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fat</td>
<td>70.15</td>
<td>11.74</td>
<td>10.13</td>
</tr>
<tr>
<td>Starch</td>
<td>44.45</td>
<td>6.17</td>
<td>49.38</td>
</tr>
<tr>
<td>Sugar</td>
<td>40.00</td>
<td>6.66</td>
<td>35.94</td>
</tr>
<tr>
<td>Citric acid (CIV, H170)</td>
<td>41.38</td>
<td>3.45</td>
<td>55.17</td>
</tr>
<tr>
<td>Maleic acid (CIV, H160)</td>
<td>47.48</td>
<td>4.98</td>
<td>13.14</td>
</tr>
<tr>
<td>Alumimium</td>
<td>42.32</td>
<td>4.47</td>
<td>13.39</td>
</tr>
<tr>
<td>Collagen</td>
<td>46.10</td>
<td>4.72</td>
<td>13.66</td>
</tr>
</tbody>
</table>

From this table it may be gathered that vegetable diet consumes more oxygen in the production of carbonic acid and water than animal diet. This is also found to hold good in the case of carnivorous and herbivorous animals—the latter taking up a larger quantity of oxygen than the former.

The nitrogen of the atmosphere appears to act as a diluent, and to temper the activity of the oxygen gas. Although when animals are placed in atmospheres of pure oxygen, or hydrogen, a certain quantity of nitrogen is thrown out from their lungs, it still requires proof that this has been taken up from the atmosphere. It is not improbable that a certain quantity of nitrogen may be thrown off by the decomposition of the nitrogenous tissues in the blood, or excretions.

With regard to the watery vapour which passes off from the lungs, we have already seen that it is sufficient to saturate the expired air. Its absolute amount is therefore influenced by the following circumstances:—1 By the volume of air expired; 2, By the quantity of watery vapour contained in the air previous to its inspiration; 3, By the temperature of the inspired air; 4. By the amount of inspiration, which each volume of inspired air is allowed to remain in the lungs.

We have thus considered the principal physical and chemical phenomena presented during the respiration of animals.

It should however be recollected that these phenomena are...
The expenditure for the year was £51,319,119, under the following heads:

<table>
<thead>
<tr>
<th>Charges of collection and other payments before reaching the Exchequer</th>
<th>£</th>
</tr>
</thead>
<tbody>
<tr>
<td>£5,189,159</td>
<td></td>
</tr>
<tr>
<td>£14,357,137</td>
<td></td>
</tr>
<tr>
<td>£4,985,745</td>
<td></td>
</tr>
<tr>
<td>£320,688</td>
<td></td>
</tr>
<tr>
<td>£446,068</td>
<td></td>
</tr>
<tr>
<td>£3,979,119</td>
<td></td>
</tr>
<tr>
<td>£70,390,343</td>
<td></td>
</tr>
<tr>
<td>£167,216,988</td>
<td></td>
</tr>
<tr>
<td>£2,913,029</td>
<td></td>
</tr>
<tr>
<td>£31,319,112</td>
<td></td>
</tr>
</tbody>
</table>

Showing an excess of expenditure over income of £7,262,466. The amount of the public funded debt, on Jan. 5, 1858, was £27,047,704. The following table gives the gross results from 1833 to 1856—

<table>
<thead>
<tr>
<th>Years</th>
<th>Revenue</th>
<th>Expenditure</th>
<th>Surplus</th>
<th>Deficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1838</td>
<td>£52,124,471</td>
<td>£52,263,569</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>1839</td>
<td>£47,567,565</td>
<td>£49,161,256</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>1840</td>
<td>£46,034,339</td>
<td>£50,185,729</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>1841</td>
<td>£45,365,520</td>
<td>£50,045,169</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>1842</td>
<td>£42,120,287</td>
<td>£41,199,818</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>1843</td>
<td>£54,005,246</td>
<td>£50,674,064</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>1844</td>
<td>£53,000,554</td>
<td>£49,282,713</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>1845</td>
<td>£58,756,128</td>
<td>£50,843,300</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>1846</td>
<td>£54,821,564</td>
<td>£52,994,248</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>1847</td>
<td>£53,386,717</td>
<td>£44,161,136</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>1848</td>
<td>£52,351,749</td>
<td>£50,633,923</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>1849</td>
<td>£52,810,680</td>
<td>£50,231,374</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>1850</td>
<td>£52,233,006</td>
<td>£49,506,610</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>1851</td>
<td>£52,210,071</td>
<td>£50,792,912</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>1852</td>
<td>£54,430,544</td>
<td>£51,174,384</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>1853</td>
<td>£54,949,192</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>1854</td>
<td>£58,364,605</td>
<td>£45,604,778</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>1855</td>
<td>£72,216,988</td>
<td>£82,233,400</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

In 1857 the revenue amounted to £70,390,343, from the following sources:

<table>
<thead>
<tr>
<th>£</th>
<th>Expenditure was—</th>
</tr>
</thead>
<tbody>
<tr>
<td>£23,632,907</td>
<td>£15,479,244</td>
</tr>
<tr>
<td>£5,957,816</td>
<td>£4,386,507</td>
</tr>
<tr>
<td>£59,502,948</td>
<td>£54,185,130</td>
</tr>
<tr>
<td>£54,003,753</td>
<td>£50,943,830</td>
</tr>
<tr>
<td>£49,506,610</td>
<td>£47,298,806</td>
</tr>
<tr>
<td>£2,846,308</td>
<td>£2,147,569</td>
</tr>
<tr>
<td>£60,000</td>
<td>£40,937</td>
</tr>
<tr>
<td>£71,124,098</td>
<td>£65,500</td>
</tr>
<tr>
<td>£78,090</td>
<td>£60,000</td>
</tr>
<tr>
<td>£1,104,132</td>
<td>£1,100,357</td>
</tr>
</tbody>
</table>

The expenditure now £70,354,246. The salaries of the Revenue Department form a separate charge, and are no longer deducted as charges of collection before the remission to the Exchequer, and are consequently subject to parliamentary supervision. The National Debt, funded and unfunded, at the end of 1857, was £290,382,099, of which 21,555,410£ was created in 1855. In addition to the sums shown as excess of revenue over expenditure in the preceding years, the greater part of which had been applied to the reduction of the Debt, an Act was passed in 1853 by which the South Sea Stock, a certain Bank Annuities, and Three per Cent. Annuities, were incorporated with the National Debt upon terms which added something to the nominal amount of capital, but produced a large reduction in that of the interest paid. In 1842 the Property Tax, as proposed by Sir Robert Peel, was imposed to remedy the annual desolation in the revenue. It was supposed to touch the pound in all seasons of a good year and upwards. Its effects were visible in 1843, and enabled him to make extensive reductions in the customs and excise duties, to the great benefit of the commerce of the country, as well as the comfort of the inhabitants. The system necessarily interfered with the processes of manufacture—are unavoidably injurious—and are a check upon improvement. In 1797, not fewer than 20 articles were subject to duties of excise. The list included salt, wine, beer, cider, and perry, hides and skins, printed goods, candles, bricks and tiles, starch, soap, starch, linseed, sweets and mead, wickets and glass. There were separate
Boards of Excise for England, Scotland, and Ireland, the functions of which were discharged by 21 commissioners. In 1858 there is only one Board for the whole of the United Kingdom, the number of commissioners has been reduced to seven, and the number of articles in which officers dealt with reports and their regulations, and the amount of work or manufacture has been reduced to four; namely, hops, malt, paper, and spirits. The amount of vexations meddling which has thus been got rid of can only be estimated by those who have had experience of it, and it is to be regretted that in the last years, when the most conscientious respect for the law rendered it difficult at all times to avoid infringements of the regulations of the Board, and when a manufacturer was often at the mercy of the exciseman, and might easily be ruined by a small error, these Business of the regulations of the Excise Board have been simplified in a manner which has greatly lightened the duties of the officers and of the people they have to deal with.

In December 1875, a number of the old excise regulations were renewed for a limited number of years. Sir William Benjamin Disraeli was then Chancellor of the Exchequer, and had already shown his regard for the Excise by several important reforms. He was enabled triumphantly to refer to this popular test. He could show that the effect of remissions of duty, in the way of recovery, was twofold: upon the consumer of the particular article, by enabling him to increase his consumption, and next upon the general consumer, by extending and widening the consumption of the excisable products of the part of the great body of the people. Mr. Gladstone, therefore, proceeded, in reliance upon former facts, to carry on the work of tariff reform on the following principles, as far as his financial engagements permitted it:

1. To abolish altogether the duties which are unproductive, except in cases where there may be some special reason to retain them on account of their relation to other articles.

2. To abolish, as far as revenue considerations will permit, duties which are productive of revenue, but which are a burden to the last stage of finished articles, and are commonly connected with hand-labour, in regard to which it was considered more prudent to proceed in the mode, not of abolition, but of reduction.

3. Whenever it can be done, to substitute rated duties for duties ad valorem.

4. To get rid, except in a few instances where it is important on account of revenue, of the 6 per cent. addition to the duties and the 5 per cent. addition to the duties, in the transaction of business. The articles which the 6 per cent. additional duty is still retained are seven in number, and the duty in question produced 327,167, in 1848; Tobacco, wine, tumbler of British possessions, pepper, gloves, porcelain, and tobacco, a per cent. additional on tins only realized 135,234, and on gloves 1,646.

5. To merge the differential duties in favour of British possessions by lowering the foreign article to the level of the colonial, and where this is not expedient, not to raise the duty on the former of the two.

6. To lower the duties that press on foreign articles of food which enter largely into what may be called the luxuries and comforts of the mass of the people.

The result of this was, that the duty of articles was dealt with on these principles—first the duty was repealed, and on 160 important reductions were made. The immediate loss to the revenue consequent on these alterations was estimated at 1,383,000l. The changes are analogous to those effected in 1843 and 1845-6; and the same result was produced—the gradual recovery of revenue by increased consumption.

The soap duty was entirely abolished, on the ground that it was injurious to health and comfort, that the interference with one branch of the domestic and national improvement, and disabled the manufacturer from competing in markets abroad with the foreign soap-maker, who was free to carry on his business according to the most approved methods, and not under peremptory restrictions; and because the necessary amount of tax is supplied to the extent of one-fourth by textile manufacturers entailed fraud and occasioned great loss to the revenue. It is evident that "considerations of revenue" alone prevented the duty on paper being similarly dealt with.

There were three different rates of duty in the United Kingdom on home-made spirits, and this antiquated mode of dealing with the article led to smuggling. An approximation was therefore made in 1853 towards their equalisation by adding 1s. per gallon to the duty on Scotch spirits, 6d. on Irish spirits, reserving to an early period the further advancement of the principle of equalisation. This was accomplished, as far as regards Scotland, in 1853, by advancing the duty on that kingdom to the same as that in England. By this means the working of the Excise was simplified; the number of excise officers. At the same time the duty in Ireland was raised so as to bring it to so near an approximation, that smuggling almost ceased to be remunerative; and in April, 1868, Mr. Disraeli, then Chancellor of the Exchequer, in his budget proposed an entire equalisation.

Another great object of the Budget of 1853 was to establish a general uniformity of taxation in the three kingdoms under another important head, by rendering Ireland liable to the duties and excises charged in the United Kingdom. The Chancellor of the Exchequer was willing to make a great sacrifice. He remitted a sum of 4,560,000l. due from Ireland to England, constituting an annual charge of 245,000l., three-fourths of which burden would have continued for forty years. He swept away this debt, and commuted the charge in consideration of an addition of 5d. per gallon on Irish spirits, and the income-tax for seven years. Ireland had been exempted
from this tax in 1848, in consideration of a duty of 1s. additional on spirits, and an augmentation of stamp-duities; but the first, was abandoned almost as soon as enacted, and the second disappeared in 1850, when a reduction of stamp-duities took place both in this country and Ireland. Exemption or partial exemption was usually granted to goods imported from Britain; but in the case of Irish goods there was no principle to impose the tax on Ireland, which would otherwise derive advantages at the cost of the people of England and Scotland. The complex system of the assessed taxes, levied under several heads, and claimed, was dealt with, from a view of securing simplicity and uniformity. With this object the progressive plan of assessment has been abolished, also compositions, and, as far as possible, exemptions.

Some important alterations have been made under the head of Stamps. Penny receipt-stamps have been substituted for stamps of varying value, in order to obtain the advantages of uniformity, and to remove the temptation to evasion; and the facilities of trade have been promoted by allowing a penny receipt-stamp to be used in connection with bankers' cheques, so as to add to their security. [Sawv Dunve, S. 2.]

The most important portion of the Budget of 1853 was undoubtedly the new tax on successions, which subjects every estate to duty, whatever is left out of the income-tax, it was alleged, pressed unequally on intelligence and skill, as compared with property, and the succession-tax was designed to adjust the balance. Real property, whether settled or unsettled, had hitherto been exempt from legislation of this kind; claimants were permitted an estate in land of 50,000/. a year to pass to the heir without his contributing one farthing to the state, while a poor man who received a legacy of 100/. paid a tax of 10d. The anomaly has now ceased, and a person who succeeds to a landed estate of 10,000/., is taxed on the annual value of his property, which, on the principle of calculation adopted, gives a rent of 300/. a year.

The income-tax was retained, but was associated with regulations of industrial taxation to an amount exceeding 5,000,000/., and its extinction was finally provided for in 1860, on the ground that it was not well adapted to form a permanent portion of ordinary public income. It is like the reserve of an army, which should only be brought forward to avert great dangers or accomplish important objects. It may reconcile those who dislike the inquisitorial nature of this impost to consider what it has effected under the opposite conditions of war and peace.

Next, which lasted, with two brief intervals, from 1793 to 1816, there were three periods, in the first of which there was no income-tax; in the second it was only incompletely adopted; and in the third it was fully brought into operation. 1773-1786, there was no income-tax. The charge of government, and the charge of debt incurred before 1793, together with the cost of war, amounted on the average of these six years to 36,030,000/. a year. The revenue, with all the additional taxes laid on, amounted to 20,526,000/., leaving an annual deficiency of 15,500,000/.

In 1793, the income-tax was imposed by Mr. Pitt, and from 1793 to 1809, the cost of the war and public charges rose to 47,413,000/.; but the revenue, aided by the income-tax, amounted to 33,726,000/., and under an increase of expenditure, amounting to 11,400,000/., a year, the excess of expenditure over revenue was less by 2,000,000/., a year during these four years than from 1793 to 1798.

In 1815, 1816, 1817, 1818, 1819, and 1820, the income-tax was in full force. The expenses of the war and of government, and the charge of debt (9,500,000/) incurred before 1793, amounted to 65,794,000/., but the revenue rose to 63,780,000/., the annual deficiency, instead of being 7,404,000/., as in 1793, amounted to 2,004,000/.

In 1793, there was actually raised, during the heaviest period of war expenditure, 7,000,000/., a year more than the cost of the war. If the income-tax had been adopted at an earlier period, the national debt need not at this moment have existed. Rightly, therefore, is it regarded as an auxiliary, to be reserved for great occasions. In reimposing the income-tax for seven years, the intentions of the government were to mark it as a temporary measure, to equalise, as far as possible, its pressure on skill and intelligence as compared with property, to mitigate its operation by every rational means compatible with its integrity, and to test of the success of taxation; and on these terms it was accepted for the sake of the benefit which it brought in its train.

The Government, after giving the most mature consideration to the subject, declined to renew the imposition of the tax, because, while it appears to contribute to the success of their general financial plan. The Chancellor of the Exchequer showed that the incidence of the tax on real property was already heavier than was generally supposed, and he considered that the period of 7 years had been paid for by the pound, and that evasion or unfair assessment was impossible; while on trades and professions the principle of self-assessment entailed extensive frauds, of which he gave a striking instance. It was necessary to compensate twenty-eight persons for their profits for a single year, and they claimed 148,590/., a jury awarded 26,973/., but their return of profits for assessment to the income-tax was only 9,000/. The case of the professions, which has often been brought to tax, was raised to 10d. in the pound in incomes of 1,000/. and upwards, to 11d. on farms ranted to that amount; it was reduced to the original 7d. in 1857; and to 5d. in 1858.

"Considerations of revenue" alone prevent the further application of this principle to the financial policy of the fiscal system. The duties on paper and wine, and particularly those on fire-insurance, are amongst the first which have claims to be abolished or reduced, and which promise when relieved from taxation to be productive of the greatest advantage to the general community. It is the wish of the Government to maintain machinery in being against one of the very best principles of society—that of distributing losses which would ruin an individual, over the whole community, in a manner to render it scarcely appreciable by any. An exemption from the tax only shows its futility. Farming-stock and implements do not pay insurance duty, but a workman's tools do. The tax, however, yields upwards of a million to the Exchequer, and the Chancellor cannot afford to give it up. For, the plans have been accomplished, more than could possibly have been anticipated a few years ago; and we will conclude by quoting the closing sentences of Mr. Gladstone's able speech on introducing the Budget in April, 1853, as a fair statement of the principles which now regulate our fiscal system: "While it has expensive reductions of taxation, and when the changes we propose in taxation, to intelligence and skill, as compared with property; while we have sought to do justice to the great labouring community of England, by further extending their relief from indirect taxation, we have not been unmindful of the interests of the community, and we have felt we should best maintain our own honour—that we should best meet the views of Parliament, and best promote the interests of the country—by declining to draw any invidious distinction between individuals, by treating wealth itself as a sacred aim, to diffuse and distribute—burden if we must—benefit if we may—with an equal and impartial hand; and we have the consolation of believing that by
proposals such as these we contribute as far as we lies, not only to develop the material resources of the country, but to knit the hearts of the various classes of this great nation yet more closely than heretofore to that throne and to those institutions under which it is their happiness to live."

As intimately connected with the ameliorations of our financial system, we append a list of the taxes repealed or reduced, and of taxes imposed or increased during the following years —

### Taxes Repealed or Reduced.

<table>
<thead>
<tr>
<th>Year</th>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1840</td>
<td>Postage</td>
<td>£1,240,000</td>
</tr>
<tr>
<td></td>
<td>Other taxes</td>
<td>£19,569</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>£1,259,569</td>
</tr>
<tr>
<td>1841</td>
<td>Rice in the husk</td>
<td>£21,832</td>
</tr>
<tr>
<td></td>
<td>Other taxes</td>
<td>£5,958</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>£27,790</td>
</tr>
<tr>
<td>1842</td>
<td>Coffee</td>
<td>£291,113</td>
</tr>
<tr>
<td></td>
<td>Timber and wood</td>
<td>£68,414</td>
</tr>
<tr>
<td></td>
<td>Export duties</td>
<td>£109,778</td>
</tr>
<tr>
<td></td>
<td>Other customs duties</td>
<td>£57,659</td>
</tr>
<tr>
<td></td>
<td>Stage coaches</td>
<td>£77,779</td>
</tr>
<tr>
<td></td>
<td>Other taxes</td>
<td>£19,464</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>£1,596,396</td>
</tr>
<tr>
<td>1843</td>
<td>Timber and wood</td>
<td>£126,458</td>
</tr>
<tr>
<td></td>
<td>Spirits, Ireland</td>
<td>£240,000</td>
</tr>
<tr>
<td></td>
<td>Other taxes</td>
<td>£45,569</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>£411,292</td>
</tr>
<tr>
<td>1844</td>
<td>Coffee</td>
<td>£96,174</td>
</tr>
<tr>
<td></td>
<td>Curritans</td>
<td>£55,016</td>
</tr>
<tr>
<td></td>
<td>Wool</td>
<td>£97,140</td>
</tr>
<tr>
<td></td>
<td>Marine insurance</td>
<td>£101,359</td>
</tr>
<tr>
<td></td>
<td>Glass</td>
<td>£45,000</td>
</tr>
<tr>
<td></td>
<td>Other taxes</td>
<td>£27,271</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>£458,810</td>
</tr>
<tr>
<td>1845</td>
<td>Sugar</td>
<td>£2,093,857</td>
</tr>
<tr>
<td></td>
<td>Molasses</td>
<td>£129,163</td>
</tr>
<tr>
<td></td>
<td>Cotton, raw</td>
<td>£682,042</td>
</tr>
<tr>
<td></td>
<td>Coals, export duty</td>
<td>£115,438</td>
</tr>
<tr>
<td></td>
<td>Other customs duties</td>
<td>£380,786</td>
</tr>
<tr>
<td></td>
<td>Aances</td>
<td>£355,009</td>
</tr>
<tr>
<td></td>
<td>Glass</td>
<td>£624,000</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>£4,846,006</td>
</tr>
<tr>
<td>1846</td>
<td>Butter &amp; cheese</td>
<td>£295,437</td>
</tr>
<tr>
<td></td>
<td>Silk manufactures</td>
<td>£162,985</td>
</tr>
<tr>
<td></td>
<td>Spirits</td>
<td>£482,386</td>
</tr>
<tr>
<td></td>
<td>Tallow</td>
<td>£101,366</td>
</tr>
<tr>
<td></td>
<td>Woolen manufactures</td>
<td>£27,870</td>
</tr>
<tr>
<td></td>
<td>Seed, Clover</td>
<td>£36,477</td>
</tr>
<tr>
<td></td>
<td>Other customs duties</td>
<td>£135,069</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>£1,151,790</td>
</tr>
<tr>
<td>1847</td>
<td>Woods from foreign countries</td>
<td>£243,095</td>
</tr>
<tr>
<td></td>
<td>Sugar and molasses</td>
<td>£83,192</td>
</tr>
<tr>
<td></td>
<td>Rum</td>
<td>£47,674</td>
</tr>
<tr>
<td></td>
<td>Other taxes</td>
<td>£1,675</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>£314,080</td>
</tr>
</tbody>
</table>

### Taxes Imposed or Increased.

<table>
<thead>
<tr>
<th>Year</th>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1840</td>
<td>Customs</td>
<td>£2,778,413</td>
</tr>
<tr>
<td></td>
<td>Excise —</td>
<td>£1,054,537</td>
</tr>
<tr>
<td></td>
<td>Other articles</td>
<td>£1,084</td>
</tr>
<tr>
<td></td>
<td>Property tax</td>
<td>£7,600</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>£3,936,585</td>
</tr>
</tbody>
</table>

### 1853, Customs on.

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Window glass</td>
<td>£2,055</td>
</tr>
<tr>
<td>Caustic acid manufacture</td>
<td>£6,004</td>
</tr>
</tbody>
</table>

### Carry forward.

<table>
<thead>
<tr>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>£2,000,000</td>
</tr>
</tbody>
</table>

### 1854, Customs.

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excise —</td>
<td>£2,230,475</td>
</tr>
</tbody>
</table>

### Carry forward.

<table>
<thead>
<tr>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>£2,000,000</td>
</tr>
</tbody>
</table>

### 1855, Customs in.

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugar and molasses</td>
<td>£923,677</td>
</tr>
<tr>
<td>Stamps</td>
<td>£774,413</td>
</tr>
<tr>
<td>Spirit</td>
<td>£155,292</td>
</tr>
<tr>
<td>Sugar</td>
<td>£2,545</td>
</tr>
<tr>
<td>Other articles</td>
<td>£2,723</td>
</tr>
<tr>
<td>Excise spirit</td>
<td>£1,000,000</td>
</tr>
<tr>
<td>Income tax</td>
<td>£2,000,000</td>
</tr>
<tr>
<td>Total</td>
<td>£5,925,907</td>
</tr>
</tbody>
</table>

### Carry forward.

<table>
<thead>
<tr>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>£16,383</td>
</tr>
</tbody>
</table>

###REVIVOR. [SORE FACES, &c. 2.]

###RHAYADER. [RADONISHIREE.]

###RHEINITE. [MINERALOGY, &c. 1.]

###RHIZANTHE, Rhizanthe, Echinops, a small class of Plants, comprising the orders Balanophoraceae, Cerinaeae, and Rafflesiaceae. They are parasitical plants, destitute of true leaves, in place of which they are furnished with cellular scales. Their stem is either an amorphous, fangous mass, or a ramified mycelium, and is very imperfectly supplied with spiral vessels, which are sometimes wholly deficient. They are of a brown, yellow, or purple color, never green. They produce flowers which have genuine stamens and carpels, and are surrounded by a whorl of petaloid bodies. They possess ovules, but their seed is not known.

These plants have been regarded by Lindley, Endlicher, and other botanists, as sufficiently distinct to warrant their being placed in a class by themselves. Their flowers, stamens, and ovules, indicate their relation to the phanerogamic plants, whilst their mycelial stem, parasitic habit, and cellular structure ally them with the Fungi and other low forms of vegetation. Mr. Brown however is of opinion that the Rhizanthe asbs are but less developed forms of Eongan Plants. He regards them as having affinities with Aristolochiaceae, and other orders of Exogens. More recently Mr. Griffiths has adopted the views of Brown, and advanced...
many arguments in favour of their being degraded
forms of higher plants, and not a permanently low form
of vegetation. He thinks the relations of Rhizanthes
various. Thus he places Mystropetalum near Protocereus
and Sanctaloea; Sarcoptilis and Balanophora he places near
Utrecchio. Finally, he places Thamnium between Taccaceae
and Balanophoraceae.

The following are the orders of Rhizanthes as recognised
by Lindley—

<table>
<thead>
<tr>
<th>Order</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ovules</td>
<td>Solitary, pendulous; fruit one-seeded</td>
</tr>
<tr>
<td>Ovules</td>
<td>Ovulate, parietal; fruit many-seeded; calyx 3-4-6-parted; authors opening by alata</td>
</tr>
<tr>
<td>Ovules</td>
<td>Ovulate, parietal; fruit many-seeded; calyx 5-parted; authors opening by Rafflesiaceae ports</td>
</tr>
<tr>
<td>RHIZOBOLACEAE</td>
<td>Ricobola, a natural order of Plants, consisting of trees of very large size</td>
</tr>
<tr>
<td></td>
<td>The leaves are opposite, digitate, coriaceous, with a pointed stalk and no stipules; flowers large, regular, arranged in racemes, with their stalks pointed at the base and below the apex; the sepals are 5 or 6, more or less combined, imbricated in asstivation; petals 5 to 6, equal-sided, but unequal thickish, arising along with the stamens from a hypogynous disc; fruit of several combined indiscernible one-seeded nuts; seed reniform, exalbuminious, with a cord dilated into a spongy exesscence; radicle and scutellum of these species are round. They are large timber-trees, some of which yield edible fruit. It is from this order of trees that are produced the Souari (or Suwarow) Nuts of the shops, the kernel of which is one of the most delicious fruits of the nut kind that is known to man; this nut is especially found inferior to that of the olive. The timber of the tree is used for shipbuilding. (Lindley, Vegetable Kingdom.)</td>
</tr>
<tr>
<td>RHIZOCARPEAE</td>
<td>[Mariscaceae, S. 2.]</td>
</tr>
<tr>
<td>RHIZOMORPHA</td>
<td>[Ricinaceae]</td>
</tr>
<tr>
<td>RHODALITE</td>
<td>A Mineral which appears to consist of small rectangular prisms with square bases. Hardness about 2. Colour between rose-red and flesh-red. Specific gravity 2. Before the blow-pipe per se not altered. With carbonate of soda fuses into a greenish-blu transparant bead in the exterior flame, becoming yellow in the interior flame: with borax gives a transparent colourless bead; with phosphate of soda does not fuse. It is found in Ireland, occurring probably in an amygdaloidal rock. An analysis by Mr. Richardson gives—</td>
</tr>
<tr>
<td>Silica</td>
<td>55-9</td>
</tr>
<tr>
<td>Alumina</td>
<td>8-3</td>
</tr>
<tr>
<td>Peroxide of Iron, and trace of Oxide</td>
<td>of Manganese</td>
</tr>
<tr>
<td>Limestone</td>
<td>1</td>
</tr>
<tr>
<td>Magnesia</td>
<td>0-6</td>
</tr>
<tr>
<td>Water</td>
<td>2-0</td>
</tr>
<tr>
<td>RHODEORETINE</td>
<td>[Chemistry, S. 2.]</td>
</tr>
<tr>
<td>RHODIOLA</td>
<td>[Senega.]</td>
</tr>
<tr>
<td>RHODIZITE</td>
<td>A Mineral resembling Boracite [Bason] in its crystals, but it tinges the blow-pipe flame deep red. It occurs with the Red Tourmaline of Siberia. (Dana.)</td>
</tr>
<tr>
<td>RHODAMMONIAE</td>
<td>An order of Algae, consisting of purplish or blood-red Sea-Weeds, with an expanded or filiform inarticulate frond, composed of polygonal cells, occasionally traversed by a fibrous axis; superficial cells minute, irregularly parted, or rarely disposed in filamentous series; fructification in acropetal clusters, or frequently in the form of a sphere, or with a more or less bulbose or hemispherical, imperfect, containing beneath a thick pericarp a mass of spores affixed to a central placenta. The root is disc-like or branched, sometimes much matted; frond in habit and colour, either leafy or filiform, and much branched, never articulate; in some an intense crimson, in others brown-red or purple; usually growing somewhat darker in drying. The species are widely dispersed; all our genera having representatives in the Northern Hemisphere. The species are found in South America, or South-Western. It is often used for the purpose of making jellies and blanccmanges. (Harvey, British Algae.)</td>
</tr>
<tr>
<td>RHODIANTHUS, RHODIANTHUS</td>
<td>[Flameliola]</td>
</tr>
<tr>
<td>RHYNCHITES</td>
<td>[Wawari.]</td>
</tr>
</tbody>
</table>

Some of the natural order of moss-like Plants or Herbs, inhabiting mud or water, swimming or floating, usually annual; their leaves and stems blended into a frond of a cellular structure, creeping, green or purple underneath, with a distinct epidermis, and a cavity of air-passages beneath it in some species. These plants form a plain transition from Thallogens to Acrogea. Their spores are collected in large numbers within organs resembling the pistils of Phanogamous Plants. They are slender, sword-shaped, and formed into a ring, or more distinctly formed with stomates for breathing. The genus Duriaus is regarded as forming the nearest transition to Liverworts. It fructifies under water, which is very seldom the case with the other Crystal-Worts. Of this order several noteworthy types have been observed in Europe, and the remainder in various parts of the world. Several species in North America, the Cape of Good Hope, and Brasil, appear to be very similar to those of Europe. They are 16 genera and 59 species.

RINGWOOD, Hampshire, a market town, and the seat of a Poor-Law Union, in the parish of Ringwood, is situated on the left bank of the river Avon, in 50° 50' N. lat., 1° 47' W. long., distant 27 miles S.W. from Winchester, 92 miles S.W. by W. from London, and 159 miles by road, and 104 S. by the nearest line of South-Western railway. The population of Ringwood parish in 1851 was 3938. The living is a vicarage in the archdeaconry and diocese of Winchester. Ringwood Poor Law Union contains five parishes and townships, with an area of 18,432 acres, and a population in 1851 of 5446. The town is lighted with gas. The manufacture of thread and woollen gloves employs some of the inhabitants. The chancel and transepts of the parish church appear to have been erected about 1290; the nave and the tower are more recent. There are chapels for Wesleyan Methodists, Independents, and Unitarians, and National schools. There is an excellent corn-market, held every Wednesday. Fairs for horses and cattle are held on July 10th and December 11th. Ringwood is 1 mile S.E. of RINGWOOD STATION, one of the most eminent of the writers of the newspaper press in London, was a native of Scotland, and was born in 1787. Of the history of his boyhood little is known. He was probably born in Leith or in Dundee, and he availed himself of the advantages afforded by the grammar-schools of Scotland to acquire a well-grounded education. His first known entry into public life was as an editor of the 'Dundee Advertiser,' a weekly newspaper, somewhere about or a little before 1813. In this paper he at once evinced those remarkable powers of condensation and arrangement by which his after labours were distinguished. The paper advocated liberal, or rather the Whig, principles of the day, at that time by no means generally received in Scotland, though somewhat more favoured in Dundee than elsewhere. In this period he made no secret of the talent he displayed not only ensured the popularity and success of the newspaper, but procured him the support and friendship of many of the leaders of the Whig party in Scotland. As editor he was the assailant of the corruptions of the clergy, and zealous in the cause of the improvement of the burgh schools; for the extension of habour accommodation; and the expositor of fiscal mismanagement. About 1826 his connection with the 'Dundee Advertiser' was dissolved, he having decided to associate himself with various very serious schemes. Rhoditis is an ill-defined genus, and will probably be divided into several distinct genera. Many of the species, especially of the section Calophylla, are among the most splendidly coloured of crimson and carmine Algae. Others, as R. Hombroniana, R. Rubra, R. Aulis, and R. alba, are of a deep purple. Some of them, like the sobe duels of our coasts, R. palmaria, have often as much of brown as of purple in their attire. Many of the Rhodymeniaceae are valuable in an economic sense.

R. palmata, the Duke of our coasts, is collected largely in Scotland and Ireland, and forms an important article of diet. Many of the Gracilariaceae are largely used in the East as ingredients of Balm, and jellies. They are also as substitutes for Bicarbonate of Soda. One of them, O. spinosa, is the Agar Agar of the Chinese, and is largely collected both for culinary purposes and as a component part of some of the strongest Chinese gins. It has recently been imported into England, and is occasionally used instead of carrageen moss in making jellies and blanccmanges.
realising his notion of what a newspaper should be; and no man ever worked harder, more conscientiously, or more independently to effect his object. We have already noticed his faculty of arrangement, which he thoroughly carried out in ‘The Spectator.’ Besides writing on a multiplicity of subjects himself, he gathered cases and made a nest of the well qualified and distinguished men as contributors; but in most cases he suggested the subject, and in all he critically examined every one of their productions before they appeared in print. He was a supporter, through the paper, of all the great causes to which he was attached, and of the principles of its establishment, and probably few newspapers have had so much influence in forming opinions, particularly among the more highly educated class, as ‘The Spectator.’ The caution with which opinions were expressed; the avoidance of contradiction and opposition to himself; the recognition of objections or defects in matters where an approval was given of the whole; though sometimes seeming to give an air of coldness to his judgments, and occasionally even of indecision, aided the influence, by a quiet influence. Thirty years he continued this laborious and useful life up to within a month of his death, which occurred on April 22, 1758.

RIOJA, LA. one of the provinces of the Argentine Federation, extends the country beyond the Gran Chaco, Salina and the Andes, and extends from north to south from 28° to 31° S. lat. It is bounded S. by the provinces of San Juan and San Luis, E. by Cordova, N.E. and N. by Catamarca, and W. by the republic of Chili. The area is about 658,000 square miles. The population is variously estimated at 15,000 to 25,000.

The country is described generally under PLATA, LA. STATES OP. It consists of a narrow strip of cultivable land along the river base, with a series of vast, flat and round valleys of Famatina and Guandacol, and a pastoral tract extending round the southern extremity of the Sierra de Velasco. Only the northern districts of the country east of the Sierra Famatina are fit for agriculture. The province is by far the most easily accessible from intercourse with the more civilized parts of the Confederation. The roads leading to La Rioja are mere circuitous paths, hardly passable by mules, and the country is altogether in the most backward condition. The province is divided into four departments—Arango, Famatina, Guandacol, and the Llachas. Arango lies east of the Sierra de Velasco, and produces wheat, maize, and cotton; but its principal wealth is its vineyards. From 7000 to 10,000 barrels, of 16 gallons each, of a strong sweet wine, and about 3000 barrels of brandy are annually made, nearly the whole of which is exported to Cordova and the neighbouring provinces. The capital, La Rioja, is also that of the whole province. Famatina lies to the west of Arango, between the Sierra de Velasco and the Sierra Famatina. It contains rice, maize, and barley, and annually makes about 6000 barrels of wine annually. This department takes its name from the Sierra Famatina, celebrated for its mineral wealth. The silver-mines of Famatina are very rich, but the remoteness and inclemency of their situation—they being above the line of vegetation, and only accessible by difficult mountain-paths—have hitherto prevented them from being worked except on a small scale. The capital, Chilette, is a place of no importance. Golite prevails to a fearful extent in the valley of Famatina. Guandacol lies between the Sierra Famatina and the Andes, and produces very rich crops of wheat. It is thinly inhabited, and chiefly by aborigines, who hunt the vicuña in the adjacent mountains. The wool of the vicuña is the only article of export. Guandacol, the northern part of which is occupied by a detach of the British, consists chiefly of a desert plain, containing a great number of grisy cases, on which there are numerous cattle-farms. About 20,000 head of cattle are annually reared. Like the other provinces of the Argentine Confederation, La Rioja is governed by a governor appointed by the central government. The state government is nominally vested in a governor and municipal junta of five members. La Rioja, the capital of the state, is situated at the foot of the Sierras Famatina and Guandacol. It contains some substantial houses, a few public buildings, the only school in the province, and about 3000 inhabitants.

RIPLEY, [Yorkshire].

ROCCAMBOLO, [Alias].

ROCELLIC ACID. [Chemistry, S. 1.]

ROCHEA (named after La Roche, a French Botanist), a genus of Plantae belonging to the natural order Crossosomata. It has a 5-lobed calyx; petals 6, united into a pappose hypophyllous corolline, with a short tube, equal in length to the spreading limb or shorter than it; stamens 5, alternating with the petals, a little exserted; glands and carpels 5. The species are feebly simple, erect shrubs. The leaves are decussate, the flowers white, with petal-like bracts. The petals are disposed in terminal corymbs, without any bracts. A large number of the species are cultivated in our gardens and greenhouses.

ROGERS, SAMUEL, was born the 30th of July 1703, at Newington Green, a suburb of London. His father, who was a Dissenter, and much respected by the Dissenters of London, was a banker by profession; and the poet, after a careful private education, was placed, when yet a lad, in the banking-house to learn the business prior to his becoming a merchant. In 1718 he was graduated at the University of Wilkes calling at the banking-house to solicit his father's vote, and, as his father was out, shaking hands with him as his father's representative. From a very early period, the future poet exhibited a taste for letters, and he used his first determination towards poetry from the effect produced upon him by reading Beattie's 'Minstrel' when a mere boy. His admiration of literature and literary men led him, while still a clerk in his father's bank, to meditate a call on Johnathan Swift, the great philosopher and poet. On one occasion, with a young friend, he went to Johnson's house in Bolt Court bent on accomplishing the object, but his courage failed him when he had his hand on the knocker. It was in 1765—two years after Johnson's death—that Rogers, then in his twenty-sixth year, went with his book, The Poems, to the bank and house of Dr. Johnson, and there placed it under the title of 'An Ode to Superstition, and some other Poems.' The date is important. 'The commencement of a new era in British Poetry,' says a critic, 'dates almost exclusively from this year.' In 1765, there had been manifestations of a new poetic spirit, different from that of the poetry of the 18th century as a whole, and more particularly from that of Dr. Johnson, Hayley, and the Della Crusca, who represented the poetry of the 18th century in common. In 1765, Rogers, first of all English poets, published his Library in 1761; and Cowper had made his first distinct appearance as a poet in 1761, when he was already in his fifty-second year. Crabbe's Village was published in 1763, and Cowper first made an effective impression by the publication of his second volume, including his Task, in 1765. Thus Rogers was heard of as a poet almost at the same time as Crabbe and Cowper. But more exactly contemporary with Rogers than either Crabbe or Cowper, was Robert Burns, whose shade brightens up the landscape, overshadowed as it was by that very year, 1765, which saw Rogers's 'ASIM in an author.' In short, Rogers's first appearance as a poet coincides with the opening of that era in our literature in which we still are, and of which Rogers himself is one of the minor stars.

Rogers was a great man as a poet. He lived in France, where he saw Condorcet and many other men after wards celebrated in the French Revolution. He also visited Scotland, where he saw Adam Smith, Dr. Robertson, and other celebrities. In 1762 he published his 'Pleasures of Memory,' by which, and by a subsequent volume containing 'An Epistle to a Friend and other Poems,' published in 1766, he "established his place among the men of letters who adored Great Britain in the closing decade of the last century." During the next fourteen years he gave nothing new to the world, either to increase or to mar his reputation. It was during this long interval of silence that he retired from his hereditary business as a banker (though with an income still derived from the bank, and with the nominal character of a partner) to study the resources of his ample wealth, a leisure absolutely at the command of his private tastes. "The house of Rogers in St. James's-place," it is said, "became a little paradise of the beautiful, where, amid pictures and other objects of art, collected with care and arranged with taste, the habits of the nobleman and statesman prevailed, and kept up among his contemporaries a character in which something of the Horace was blended with something of the Mincus. As he had known Fox, and Horne Tooke, opposite political sentiments, and men of the highest talent and taste, and others of the eminent men of the former generation, he gathered round his table the political and social, and literary and dramatic celebrities who had succeeded them—Wordsworth, Scott, Byron, Coleridge, Mackintosh, Southey, Welington, Chatterey, &c, &c. His own political sentiments were those of moderate Whiggism, but this did not prevent men of all parties from being his guests."
In 1812, Rogers, when his muse seemed dead, added to a remarkable velocity of his years, the temperament entitled "Columbus." He was then in his fifty years. In 1814 his "Jacqueline" was published in conjunction with Byron's "Lara," this being the period of the height of the intimacy between the two so dissimilar poets. "Composed with the same descriptive and poetic passion, and with the same degree of smoothness," says the writer of a sketch of his life, "his Human Life" appeared in 1819. Finally, as the last and much the longest of his productions, came his "Italy," the first part of which was published in 1822, in the poet's ninety-third year. His work, in which, he contributed the author's care, at an expense of 10,000/., by Stothard, Prout, and Turner, did not appear till 1836. With the preparation of this exquisite book his literary career may be said to have come to a close; the rest were occasional copies of verses at the rate of a copula a week; and some of those trifles, including one written as late as his ninety-first year, are preserved in his collected works. But on the whole it was in his character as a superannuated poet, living on the repudiation of his past performances, drawing the artists and wits, and men of rank of a more modern age around him, and entertaining them with his caustic talk, and his reminiscences of the notable persons and events of former days, that he figured in a second portion of London life during the last years of his existence." The longevity of the poet was, indeed, one of the sources of the public interest felt for him in his later life. Always fond of open air exercise and of going to public exhibitions, he might be seen strolling about one of his still intact houses, or holding a few of his annual fays of an accident the streets at last disabled him from walking out; but the extraordinary tenacity of his constitution enabled him to recover from it, when a younger man might have died. It was not till the 10th of December 1856, when he was in his ninety-third year, and had for many years been the literary patriarch of his country, that he departed this life. Wordsworth and many other friends who had been born after him, and had attained old age in his view, had preceded him, and left him alone among a generation of juniors.

Rogers will be remembered partly for his poetry, and partly from the peculiar connection in which he stood, in virtue both of his longevity and his social position and habits, with the miscellaneous phenomena, and especially with the art and literature of his time. His poetry is of the highly finished and tasteful rather than the powerful kind. "We have in his works," says a critic, "a classic and graceful beauty; no slovenly or common lines; fine cabinet pictures of soft and mellow lustre, and occasionally trains of thought and association that awaken or recall tender and heroic feelings." His relations to his time was less of active influence than those of shrewd observation and interesting reminiscences. A good deal is said of his "Table Talk," published since his death, by his friend Mr. Dyce. ROMEINE. [MINERALOGY, S.1.] ROSEWOOD. [TRIPTOLEMUM, S.2.] ROYAL HOLLAND SHIP- WRECK. In his essay, "The Commerce of the Seas," J. B. Ross, Rear-Admiral Sir John, Knight, was born June 24, 1777, at Balaarock, Wigtonshire, Scotland. He was the fourth son of the Rev. Andrew Ross, of Balaarock, minister of the parish of Inch. He entered the navy as a first-class volunteer November 11, 1786, on board the Peal, 32 guns, and served in the Mediterranean till 1789. From November 7, 1790 till 1791, he served on board the Impregnable, 96 guns, in the English Channel. After being some years in the Navy, he went to sea in 1799, as a midshipman on board the Wessel, 20 guns, in the year which that year formed part of the expedition to the coast of Holland. After having served on board several other king's ships, he received his commission as lieutenant, March 13, 1805. While attached to the Juno, 18 guns, in 1806, it was severely wounded in four places in cutting out a Spanish vessel under the batteries of Bilbao, for which, in 1808, he was granted a pension of 382/. a year, increased in 1815 to 1500/. a year. In 1812 he was ranked of commander February 1, 1812, and was appointed to the Bridgeport, 28 guns, with orders to proceed in her Southward to other vessels, till the termination of the war in 1815, during which period he performed several valuable services. He married his first wife in 1816. He was stationed in the Mediterranean in 1816, and in the same year was promoted to the rank of commander, and in 1817, he took a letter from Sir George Hope, one of the Lords of the Admiralty, informing him that two ships were to be sent out, to "ascertain the existence or non-existence of the new species of pecten," and inquiring whether he was disposed to undertake the command of the expedition. Having expressed his willingness to do so, he was directed to repair to London, where he arrived on the 30th of December. On the 14th of January 1816, he received his commission as commander of the Grace Darling, 68 guns, under the command of Captain W. E. Parry being appointed to the command of the Alexander, 252 tons. The two ships departed from the Thames, April 25, 1818. They sailed up the eastern side of Davis's Strait and Baffin's Bay, and returned through the Arctic and North-West Passage. The Alexander, with a total of 10,000 tons, was a considerable distance behind the Isabellas. Parry however and his officers could see no mountains, and were greatly surprised and disappointed when the Isabella turned her head eastwards, and gave the signals for Alexander to follow the example. Ross named the supposed high land the Croker Mountains, and has laid them down in his chart as a continuous chain closing up the bottom of the supposed bay. This was a mistake, as Parry believed at the time that he had been the first to see the entrance to Davis's Strait. The ships arrived in the Thames on the 14th of November, 1818. On the 7th of December, the same year, Ross was advanced to the rank of post-captain. Ross was in command of the, Alexander, 1819, under the Orders of the Admiralty, in his Majesty's ship Isabella and Alexander, for the purpose of exploring Baffin's Bay, and entering into the Probability of a North-West Passage, 21° 40' N. 1819.

After the unsuccessful attempt of Captain Parry to reach the north pole, in 1827, Captain Ross submitted to the Lords of the Admiralty and to the Lord High Admiral the plan of another voyage of discovery to the Arctic seas. The government having granted him a small sum, a steam-ship was equipped at the expense of Mr. Felix Booth (afterwards Sir Felix Booth), then sheriff of London. The ship was named the Victory, and was fitted with an engine, invented and patented by Messrs. Brathwaite and Ericsson, which proved to be so bad as to be almost useless. Commander James Clark Ross, nephew of Captain Ross, was chosen as second in command. They had an attendant vessel of 16 tons hulk, granted to them by the Admiralty, named the Kruse eastern. The Victory, with its attendant, left the Thames May 24, 1839, and, using partly her sails, and partly her "execrable machinery," as Ross calls it, entered Davis's Straits, July 5. Captain Ross expected to find a north-west passage through Prince Regent Inlet, which he knew to be a passage, and to proceed up Baffin's Fury, which had been wrecked. The Victory and the Kruse eastern entered the Inlet on the 12th of August, and on the following day discovered the wreck of the Fury. They afterwards proceeded up the Inlet, and on the 8th of October were frozen in at the narrow front, west side of the Gulf of Boothia. They were not released from the ice till the 17th of September 1839, and were able to advance but a very short distance before they were again frozen in on the 31st of October. On the 20th of August 1831, the Victory was again released from the ice, but on the 20th of September was forced by the pressure into another harbour. In April 1832 the soldiers commenced carrying north aboard the boats, and a few men out of the ship, and an additional 292 tons of stores were finally abandoned. Captain Ross, in his journal observes, "In the evening I took my own aide de camp's observation. It was the first vessel that I had ever been obliged to abandon, after having been eleven months in a period of forty-two years." Some of the crew had died, and the rest were much weakened, but they struggled on till the 15th of August 1833, when the ice broke, and they were enabled to set sail in the boats. On the 25th of August, when near the point of land to the northward of the ship, the Isabellas, which was out on a whaling voyage. The mate in command of a boat that was sent to them, Captain Ross asking him the name of the vessel, said it was the Isabellas, Captain Ross, met by the vessel's master, and stated that I was the identical man in question, and my people were the crew of the Victory." Unshaven as they all were, dirty, dressed in tattered skins, and wasted almost
to the bones, the man doubted the statement, and said that Captain Ross had been dead two years. He was easily convinced of his error, and they were received on board the Isabella, with the yards and rigging manned, and with three hearty cheers. The Isabella arrived at Hull on the 18th of
September, 1833, and on the 19th Captain Ross reached London by steamer.

While the ships were frozen up in the Gulf of Boothia, many observations and surveys were made by Commander Ross, and some by Captain Ross himself, of the coasts and country which they named Boothia Felix. During one of these journeys Commander Ross discovered, June 1, 1831, a species of a new animal, which he named Leukenhoekia n.sp., now known by its name of 70° 6' 37" N. lat., 96° 49' 45" W. long., where the dripping needle indicated a dip of 89° 59', or within one minute of the vertical.

On the 24th of December 1834, Captain Ross received the honour of knighthood, together with the companionship of the Bath. Many other honours and several rewards were conferred upon him. In 1835 he published a 'Narrative of a Second Voyage in Search of a North-West Passage, and of a Residence in Arctic Regions during the years 1829, 1830, 1831, 1832, 1833, by Sir John Ross, C.B., &c., Captain in the Royal Navy, including the Reports of Commander (now Captain) James Clarke Ross, R.N., F.R.S., F.L.S., &c., and the Discovery of the Northern Magnetic Pole,' 4to, which has been since published as 'Appendix to the Narrative,' &c., also in 4to, chiefly consisting of accounts of the Eskimaux, and of the zoology, the meteorology, and similar matters. On the 8th of March, 1839, Sir John Ross was appointed consul at Stockholm, which station he maintained until the 24th of December, 1840, when he went out in search of Sir John Franklin, in a small vessel of 90 tons, named the Felix, and remained one winter in the ice. The government lent him no assistance, and early in 1839 he wrote a pamphlet, in which he complained of his own treatment, and in the same pamphlet is entitled 'A Narrative of the Circumstances and Causes which led to the Failure of the Searching Expeditions sent by government and others for the Rescue of Sir John Franklin.'

Sir John Ross's first wife having died in 1832, he married a second, October 21, 1834. By his first wife he had issue one son, who is a magistrate at Cawpoor in Hindustan. Sir John Ross is the author of 'Letters to Sea-Officers,' 'Memoirs and Correspondence of Admiral Lord de Saumares,' &c.

ROSSIA, a genus of Cephalopoda Mollusca, named by Professor Owen in honour of Sir John Ross, who found one of the first specimens in the Arctic Sea. It belongs to the family Tethisida, and has a rounded or oval body, furnished on each side with a suborbicular fin; a large head, with eyes covered by a transparent scutum, and in the young: with a tentacle; with several small holes; arms ten, two tentacular and reticulate, elb. conicorous, flexible, small, and sub-biarticulate. There are five species, of which two are British, R. macromela and R. Ocest. These have been both taken in Ireland, and the latter also near Benchich, in the Isle of Wight.

ROTIFERA, Wheel-Animalcules, a class of animals placed by Ehrenberg among the Infusoria, under the name of Rotatoria. They have acquired these names on account of the apparent rotation of the discs of organelles which surround their minute bodies, and which are covered by cilia. These structures are very minute, and although some of the larger forms may be detected by the naked eye, their organisation can only be seen by the aid of the microscope. We are indebted to Leukenhoek for the discovery of their existence, and the first account of their structure and habits. In the 'Philosophical Transactions' for 1702, he gave an account of the discovery of what is now called Rotifer vulgaris, one of the most common forms of these animals. He afterwards described a species, R. ciliata, and so on.

Subsequent observers added to the discoveries of Leukenhoek, so that in 1834 Bory St. Vincent described 80 species. In 1838 Ehrenberg published his great work on the Infusoria, and there is little doubt that he described some species. Although classed by Ehrenberg with the Polycystres, their organisation is much higher and more complicated, and the only claim they appear to have to be classed together is the fact of their minute size. [Infusorial.]

The Rotifera are very widely diffused on the surface of the earth. They inhabit both fresh-water and the ocean, and are found in the cold, temperate, and tropical parts of the earth. Although capable of swimming freely, they are usually found near or attached to the leaves of plants. They are found constantly present in ponds and streams in which Ceratophyllum, Callitriche, Valiniera, and other fresh-water plants abound.

A curious point in their history, which first attracted the notice of Leukenhoek, is their power of retaining their vitality after having been more or less perfectly desiccated. This property is undoubtedly possessed by the ova of the lower animals, especially those which are called 'flagellate.' Other animals are generally possessed by animals of an organisation as high as the Rotifera. Professor Owen states that he has observed the revivification of one of these wheel-animalcules after having been kept four years in dry sand.

The Rotifera have usually an elongated form, although some of them are nearly as broad as they are long. In most instances they are covered with a lorica or double envelope, the outer layer of which is often of a horny consistence. Some of them build for themselves a little case, or tube, in which they live, but this must not be confounded with their proper envelope. When the lorica is soft the animal has considerable power of elongating and contracting its body, as seen in Rotifer vulgaris. Many of the species are further provided with two to eight pairs of small feet, or tentacles, which is similar to that of the sea-beetle. These organs are furnished with finer hairs, or pincer-like organs, to enable them to remain stationary whilst feeding. Those which form tubes are usually fixed.

The rotatory organs, or wheels, are fleshy retractile lobes, covered with vibratile cilia, and are capable of being contracted on the inner face of the lorica, in the manner of a muscular system. Muscular bands are observed attached to the tegumentary system, and also to that part of the digestive system connected with the rotatory organs. The spines of these muscles have been observed to present the same characteristic of voluntary muscles.

The digestive system consists of a month, jaws, frequently a dilatation which may be regarded as a stomach, and an intestinal tube which has an as and orifice. The jaws generally consist of three or more lobes, to which are added a pair of jaws, which is characteristic of voluntary muscles.

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All observers agree that the Rotifera possess a nervous system, which presents itself in the form of a pair of cephalic ganglia, from which proceed nervous filaments. The extent of which we know in the nervous ganglia. For further inquiry. The red spots which Ehrenberg calls eyes are subject to considerable variations in appearance. Mr. Huxley says he observed them in young Lacinulinae, but not in adult individuals.

The existence of senses in a species of Notomata has been clearly made out by Mr. Brightwell of Norwich. The male however is much smaller and less developed than the female. All observers agree that the parts to which Ehrenberg has assigned the functions of male organs are not so certain. Caudal ciliated organs, which are described in this species, are attached to the cilia, but their nature is doubted by other observers. Mr. Huxley describes in Lacinulinae certain "vascular thickenings," which he suggests have been previously mistaken for organs of locomotion. Other species have similar organs out in most of the species. The ova are of two kinds. Mr. Huxley says in Lacinulinae they consist, first, of bodies which resemble true ova in their origin and subsequent development, and which possess only a single vitelline membrane; second, of bodies half as large again as the foregoing.
which resemble the epithillum of *Daphnia*: like it they have altogether three investments, and which do not resemble true ova either in their origin or subsequent development; while this has not been the subject of much discussion. Dr. Grant was one of the earliest writers to take them out of the *Radiata*, and place them amongst *Articulata*. The relation of such forms as *Stephanoceros* to the Ciliophoracea Poyla is very evident. In his "Memoir on Decapoda," Mr. Huxley gives his reasons for regarding these creatures as permanent larval-forms of *Echinoderma*. After referring to the various forms of Rotifers, and their homologous organs, he thus concludes:

"We may say, therefore, that the Rotifers are organised upon the plan of an Annellid larva, which loses its original symmetry by the unequal development of various regions, and especially by that of the principal ciliated cirque or trochal band; and it is curious to remark that, so far as the class can be considered a group (out of 1851), the distinct forms belong to the latter of the two modifications of the type which have been described, while the monocious forms belong to the former."

"It is in circumstances which seem to me to throw so clear a light upon the position of the Rotifer in the animal series. In a Report in which I have endeavoured to harmonise the researches of Professor Müller upon the Echinoderms, 'Annals of Natural History,' 1831, I have shown that the same proposition holds good of the latter in their larval state, and hence I do not hesitate to draw the conclusion (which at first sounds somewhat startling) that the Rotifers are the permanent forms of Echinoderm larvae, and hold the same relation to the Echinoderms that the Hydroid larvae hold to the Medusæ, or that Appendicularia holds to the Ascidians."

"The larva of a *Sipunculus* might be taken for one of the Rotifers; that of *Ophiura* is essentially similar to *Stephanoceros*; that of Asterias resembles Lacinularia or Melicerta. The pre-trochal processes of the Asterid larve Brachioaria are equivalent to those of *Brachiuran*.

"Again, the larve of some Asterid forms and of Comata are as much articulated as any Rotifer."

"It must, I think, have struck all who have studied the Echinoderms, that while their higher forms, such as *Echinus* and *Sipunculus*, tend clearly towards the dichotomous *Aaena-

"Now, if the view I have proponned be correct, the Rotifer furnishes this wanting link, and connect the Echinoderms with the *Nemertidea* and Nematoidea worms."

"At the same time it helps to justify that breaking up of the class *Radiata* of Cuvier, which I have ventured to propose elsewhere, by showing that the Rotifers are not 'radiate' animals, but present a modification of the Annellid type—belong, in fact, to what I have called the *Annuloida*, and form the lowest step of the Echinoderm division of that sub-kingdom."

Dr. Leydig, in a paper in the "Zeitschrift für Wissenschaftliche Zoologie," vol. vi., on the other hand, regards the relations of Rotifers as much more with the Crustacea than with the worms. The points of resemblance to which he draws attention are:

1. Their external figure and hard tegument, which more nearly resembles the carapace of the Crustacea than the rings of the Articulata.
2. Their muscular structure, which resembles that of many Crustacea.
3. Their nervous system resembles that of many Entomotrocha, as *Daphnia*.
4. The alimentary canal resembles that of *Daphnia*.
5. The resemblance in the character of their ova, the Entomotrocha having two kinds of ova, as the Rotifer.
6. The development of Rotifer and Entomotrocha Crustacea correspond.

Leydig composes a very able paper by proposing to call the Rotifer Ciliated Crustacea.

With regard to the arrangement of the Rotifers, that of Ehrenberg, which is exceedingly defective, has been given under *Rotauro*. From the previous observations on structure, we will see that this arrangement is open to many objections.

Dujardin, who was one of the earliest observers that pointed out the defects of Ehrenberg's arrangement, has proposed the following:

**Order I. Systolides.** Fixed by a pedicel.

2. *Stephanoceros* Eichhorni, Ehr.; *Stephanoceros*.
3. *Rotifera*.
4. *Lacinularia*.
5. *Echinodermata*

Leydig has proposed an arrangement of his own, which is preferable to either of the above.

**Ciliooctocysta.**

Animals with a jointed body and a ciliary apparatus at the cephalic extremity. The nervous system consisting of a cerebral ganglion considered the larval feat of it. Digestive and respiratory systems much developed. No heart or blood-vessels. Sexes separate. The female produces 'summer-ova' and 'winter-ova'; many undergoing metamorphosis.

A. Figure between clavate and cylindrical.

1. With elongated transversely-ribbed attached Foot.
2. *Floscularia* (Echinotassa), Ehrenberg; *F. ornata*, Ehr.; *F. appendiculata*, n. s.
4. The larval forms of *Sipunculus* (Ehr.)
5. *Sipunculus* (Ehr.)
6. *Lacinularia* (Ehr.)
8. *Melicerta* (Ehr.)

II. With elongated jointed foot, retractile, like a telescope.
1. *Cellodina elegans*, Ehr.; var. C. rosea, Parry; *C. ornata*, Parry.
2. *Hydraea cornyera*, Ehr.
3. *Sipunculus* (Ehr.)
5. *Actinurus* neptunus, Ehr.
7. *Philodina* (Ehr.).
8. *Melicerta* (Ehr.)

II. With elongated jointed foot, retractile. Foot.
1. *Cellodina elegans*, Ehr.; var. C. rosea, Parry; *C. ornata*, Parry.
2. *Hydraea cornyera*, Ehr.
3. *Sipunculus* (Ehr.)
5. *Actinurus* neptunus, Ehr.
7. *Philodina* (Ehr.).
8. *Melicerta* (Ehr.)

III. With elongated jointed foot, non-retractile Foot.
1. *Cellodina elegans*, Ehr.; var. C. rosea, Parry; *C. ornata*, Parry.
2. *Hydraea cornyera*, Ehr.
3. *Sipunculus* (Ehr.)
5. *Actinurus* neptunus, Ehr.
7. *Philodina* (Ehr.).
8. *Melicerta* (Ehr.)

IV. With a short Foot and long Pedal Foot.
1. *Nemotoma* (N. *tartist*, N. *longifis*, Ehr.
2. *Monobius* cornu, Ehr.
3. *Sipunculus* (Ehr.)
5. *Microdon* (Ehr.)

V. With short Foot and Pedal Foot, which are of equal length or somewhat shorter or longer than the former.
1. *Hydatina* senta, H. *brachydactyla*, Ehr.
4. *Rotifer*, (probably not a *Furcularia*, but a *Nemotoma*).
6. *Sipunculus* (Ehr.)
8. *Sipunculus* (Ehr.)

**Systolides.—Fixed by a pedicel.**

Family 1. *Floscularia*.

Family 2. *Melicertas*.

Family 3. *Brachionians*.

Family 4. *Furcularias*.

Family 5. *Albertarians*.


Family 7. *Tardigrades*.

Family 8. *Cellodina*.

Family 9. *Sipunculida*.
cattina, D. canina, D. caputata, D. candida, Ehr.
8. Rattalus lunaris, Ehr.
10. Tripalpia, Ehr. and N. and Ehr.
13. Theura vernalis, T. uncinatus, Ehr.

Note.—Huxley’s genus, Endopelma hydatina, is the name of Huxley in 1810 and his Notes on Normania, over to the genus Huxleyi, which latter genus however is placed far more correctly under the genus Brachthous than under Normania. *Dilegna* granulata, Weise, lastly, is the male of *D. cattina*, Ehr.

VI. Without Foot. Insecta.

Includes the A. aevula, found by Dujardin in the abdominal cavity of the ieworm, and in the intestines of the *Locietina*; and *A. coculina* discovered by Schultz in the intestine of *Naiu larilicata*.

B. Figure saciform.

I. Foot short.
1. Normanata diastolata, K. muratana, K. sinra, Ehr.
2. Dilegna laxatia, Ehr.

II. Foot absent.
1. Normanota Angios, Dalrymple; N. Sieboldii, Ehr.
2. Polyarthria platypoda, Ehr.
3. Triarthria longiseta, T. notica, Ehr.
4. Ascomorpha hodoreta, Pery; A. Germanica, Ehr.

C. Figure compressed.

a. Compressed from above downward.

I. With a foot.
1. Euclanis triquetra, E. hornemanni, E. una, E. macrura, E. dilatata, E. Lynceus, Ehr.; E. ensetata, n. sp.; E. biocinrinata, n. sp. (E.; Ehr.
2. Lepadula ovalis, L. emarginata, L. sulcata, Ehr.
5. Staknapa lamellaris, S. mutica, S. cirrata, Ehr. (Dujardin says that S. mutica is Lepadolla.)
8. Notus quadrivoinea, Ehr.

II. Foot absent.
1. Anura quadridentata, A. squamilla, A. falcu-
2. A. acicularis, A. hornemanni, A. serira, A.
3. A. nema, A. acuminata, A. flacica, A. stipa-
5. Laterally compressed.
6. Salpingo muetana, S. spinigeria, S. ventralis,
7. A. acicularis, A. brenniana, A. bicorneta, Ehr.
8. Mastigocera carinata, Ehr.
9. Monura coluris, M. dulcis, Ehr.

(Leenenhaok. Philosophical Transactions, 1701-4; Baker, Employment of the Microscope, 1733; Bory St. Vincent, Dictionnaire Classique d’Histoire Naturelle, art. Rotiferes, 1854; Ehrenberg, Infusorierken, 1838; Pritchard, Inter- 
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India. He several times read papers on the cultivation of tea and cotton in India at the meetings of the British Association for the Advancement of Science. His activity at those meetings led to his appointment for a short time as co-secretary with General Sabine of that association. In 1840 he published an Essay on the Productive Resources of India. In 1845 he also published a volume on 'The Fibrous Plants of India,' pointing out those which could be made more especially available for the manufactures of Great Britain. He took an active part in the Great Exhibition of 1851, especially in arranging the East Indian department. He was a Fellow of the Royal and Linnean societies, and held an appointment in London in connection with the East India Company. He died January 2, 1856, at his residence, Heathfield Lodge, Middlesex.

RUABON. [Denbighshire.]
RUBELLAN. [Mineralogy, S. 1.]
RUBIANA. [Chemistry, S. 2.]
RUBINIC ACID. [Chemistry, S. 2.]
RUE. [Ruta.]
RUFF. [Scopolamin.]
RUGLEY. [Staffordshire.]

RUSSIA. The following table, giving the popular divisions, area, and population of the Russian Empire, is taken from the Baron de Haxthausen's recent work on Russia:

<table>
<thead>
<tr>
<th>Division</th>
<th>Area in Square Miles</th>
<th>1846 Population</th>
<th>1852 Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Great Russia</td>
<td>229,781</td>
<td>16,290,900</td>
<td>20,403,371</td>
</tr>
<tr>
<td>Little Russia</td>
<td>150,141</td>
<td>11,093,400</td>
<td>11,775,965</td>
</tr>
<tr>
<td>New Russia</td>
<td>96,636</td>
<td>3,070,700</td>
<td>3,299,532</td>
</tr>
<tr>
<td>White Russia</td>
<td>70,399</td>
<td>2,767,200</td>
<td>2,337,436</td>
</tr>
<tr>
<td>Western Provinces</td>
<td>47,076</td>
<td>2,714,400</td>
<td>2,876,667</td>
</tr>
<tr>
<td>Baltic Provinces</td>
<td>36,516</td>
<td>1,659,800</td>
<td>1,761,907</td>
</tr>
<tr>
<td>Northern Provinces</td>
<td>680,236</td>
<td>1,588,500</td>
<td>1,420,592</td>
</tr>
<tr>
<td>Ural Provinces</td>
<td>447,738</td>
<td>10,146,000</td>
<td>10,776,181</td>
</tr>
<tr>
<td>Caspian Districts</td>
<td>123,776</td>
<td>1,089,700</td>
<td>1,165,736</td>
</tr>
<tr>
<td>Poland</td>
<td>48,240</td>
<td>4,867,700</td>
<td>5,185,543</td>
</tr>
<tr>
<td>Finland</td>
<td>135,308</td>
<td>1,412,315</td>
<td>1,499,199</td>
</tr>
<tr>
<td>Total in Europe</td>
<td>2,029,477</td>
<td>55,360,315</td>
<td>63,012,146</td>
</tr>
<tr>
<td>Ciscaucasian Provinces</td>
<td>86,578</td>
<td>2,880,000</td>
<td></td>
</tr>
<tr>
<td>Western Siberia</td>
<td>2,261,147</td>
<td>3,500,000</td>
<td></td>
</tr>
<tr>
<td>Eastern Siberia</td>
<td>2,122,000</td>
<td>237,000</td>
<td></td>
</tr>
<tr>
<td>American Russia</td>
<td>371,350</td>
<td>61,000</td>
<td></td>
</tr>
<tr>
<td>Total out of Europe</td>
<td>5,261,076</td>
<td>6,648,000</td>
<td>6,648,000</td>
</tr>
<tr>
<td>Totals</td>
<td>7,283,552</td>
<td>66,008,315</td>
<td>79,650,146</td>
</tr>
</tbody>
</table>

In respect to race, the Baron gives the following approximations in round numbers:
1. Slavonic races—Russians, 49,000,000; Poles, 6,500,000; Lithuanians and Lettish, 2,000,000; Bulgarians and Illyrians, 500,000; total, 58,500,000.
2. Other races—Germans, 650,000; Dacic Romans (Wallach), 750,000; Tschudes, 3,400,000; Tartars, 2,150,000; Mongols, 250,000; Munahun, 100,000; Hyperboreans, 200,000; Caucasian tribes, 2,750,000; Greeks, 70,000; Jews, 1,650,000; Gipisses, 50,000; Miscellaneous, 50,000; total, 19,000,000.

The revenues of Russia, of which we have no recent return, amount to about 360,000,000 silver rubles, of which 45,500,000 silver rubles were derived from the domains of the crown. The debt in January, 1856, amounted to 1,042,466,179 silver rubles. (The value of the silver rouble is about 3.4 S.)

The state of the army and navy of Russia, in the year 1857, is given in the article MILITARY AND NAVAL FORCES, S. 2.

RUSTCHUK, a fortified town in Bulgaria, capital of an eyalet in European Turkey, is situated near the right bank of the Danube, about 40 feet above the level of the river, 40 miles S. from Bucharest, and has a population variously estimated at from 30,000 to 40,000. The Danube opposite Rustchuk is nearly two miles wide, but its surface is broken by a number of islets and shallows, and the banks are low. From a distance Rustchuk has an agreeable appearance, with its white chimneys and graceful minarets, rising up from among the foliage of extensive orchards. This impression however is removed by a view of the interior, which presents dirty ill-paved streets, flanked by low wooden houses, most of which stand in little courts or gardens. The Pasha's khan, or palace, and the mosque, are the only buildings worth notice. The town has baths, a bazaar, and about 3000 houses; it has also some trade with Vienna in cloth, indigo, corn, wine, &c. A harbour for river craft is formed below the town by a small recess of the river, which is sheltered towards the north-east by a cape crowned by a bastioned citadel. Rustchuk is commanded by heights to the south-west, on which five detached bastioned earth-works have been recently thrown up. The town itself is surrounded by an earthen rampart, which presents eight bastioned fronts, revetted half-way up with masonry, and surrounded by a moat and counterscarp. The front towards the river is irregularly fortified. The Russians took Rustchuk after enormous losses of men in 1811; it opened its gates to them in the invasion of 1858. The fortified enceinte of Rustchuk measures four miles. On the left or Wallachian bank of the Danube, opposite to Rustchuk, is Giurgevo, which was originally the fortified tête-de-pont to Rustchuk. Its defences were raised in carrying out the treaty of Adrianople, but have been since repaired. A ferry connects the two places. A tall clock-tower stands in the principal square. One of the islands in the Danube is fortified. A pentagonal fort built with stone defends the harbour. Beyond this fort the town of Giurgevo is built; its enceinte presents a semi-circle towards Wallachia. Giurgevo trades with Austria in the produce of the country, and has about 7000 inhabitants. In the wars between Russia and Turkey, Giurgevo has been frequently the scene of hard fighting between the two nations. The Russians took it in 1711, and completely defeated the Turks in the vicinity the same year; they took it again in 1810. The Russians occupied Giurgevo in 1824, and were defeated by the Turks under its walls on July 7 of that year.

RUTHEN. [Dobrudza, S.]
RYDE. [Wight, Isle of]
SABADILENA. [CHEMISTRY, S. 1.] SACCHARIC ACID. [CHEMISTRY, S. 1.] SACCHARITE, a Mineral resembling granular felspar, of a greenish-white colour, and with the constitution of Lodest. It is found in Siberia, and the north of America.

SACCHULMIC ACID, SACCHULMIN. [CHEMISTRY, S. 1.] SACLACTIC ACID. [CHEMISTRY, S. 1, under MUCIC ACID.]

SACRAMENTO CITY, the capital of Sacramento County, State of California, United States of North America, is situated on the left bank of Sacramento River, at the confluence of American Fork, in 39° 34' N. lat., 121° 40' W. long., about 100 miles N.E. from San Francisco. The city was founded in the spring of 1849; in 1850 it contained 6820 inhabitants, of whom only 474 were females; and at the State Census in 1862 the population was above 10,000.

Sacramento City owes its origin to the discovery of gold, which so remarkably impetuous to California generally. It was on the south branch of American Fork, about 50 miles from Sacramento City, that gold was first discovered. The growth of the city was, from its foundation, remarkably rapid. In April 1849 there were only four houses on the site; in the following year it was laid out and regularly laid out of nearly 7000 inhabitants. The city stands in the midst of a fine farming country, and about 30 miles from the commencement of the gold diggings. Occupying a low site, it has been found necessary, in order to protect it from inundations, to which it is liable in the rainy season, to construct a levee along the bank of the river. The streets of the city cross each other at right angles; those running east and west are designated by the letters of the alphabet, and those running north and south by the numerals. Many of the streets are lined with oak and acamore trees, some of large size, imparting a considerable degree of picturesqueness to their general appearance. The city contains Episcopalian, Presbyterian, Catholic, and other churches, schools, numerous stores, above 150 eating saloons and hotels (some of which are of a very costly and splendid character), several steam-mills, and a few manufactories. Like San Francisco, Sacramento City has suffered severely from several very destructive fires; but the parts of the city which were destroyed have always been quickly rebuilt, and generally in an improved style. Several daily and weekly newspapers are published here. Regular daily communication is maintained with San Francisco by steam-boats.

SADDLEWORTH. [Yorkshire.]

SAQUINUS. [Saxon.] SAQUERUS, or SAGUES, a genus of Plants belonging to the family of Palmae. The leaves are pinnate; the flowers monoecious, with several spathes, but with numerous partial ones; the fruit hard, absciss, its surface divided into numeronous rhomboidal spaces. The species are natives of the islands of the Indian Archipelago, and yield sago.

S. Rumpfii, the true Sago-Palm, has the petioles and spathes unarmed. This plant furnishes most of the sago sent to Europe.

S. Rumphii has the petioles and spathes guarded by strong prickles. According to Martin, the sago yielded by this plant is used principally in India, and seldom exported.

SAINTE-Arnaud, Marechal Leroy DE, was born in Paris, of poor parents, on the 30th of August 1798. Having entered the Royal Body-Ordnance at the age of sixteen, he rose to the rank of sub-lieutenant in the infantry of the line in 1813. Owing to some youthful vagaries, he left the army shortly after, and embraced the theatrical profession, when he first performed at the subme Théâtre des Batignolles. In this capacity he returned to the army, and rose to the rank of major; but the revolution of July revived his taste for martial life; he returned to the army in 1831, and having entered the 64th regiment as sub-lieutenant, was made full lieutenant within six weeks. The insurrection of the partisans of the Deuchese de la Tregue, his brother, and the loss of the latter by the dread of earning the favourable notice of Marshal Bugeaud. He was subsequently appointed to the charge of the citadel of St. Blaye, where the Deuchese de Berri was confined—a post in itself, from the circumstances, somewhat painful to an honourable man, and his conduct in it incurred for him considerable odium.

In 1836 Saint-Arnaud was sent to join the army in Algiers, on the war with the Russians; he bore himself with much courage at the siege of Constantine, and received the decoration of the Legion of Honour. The brilliant courage he displayed in these campaigns obtained for him the rank of commandant of the 18th regiment of infantry in 1840, but his erratic disposition induced his removal from it to the 32nd in the following year. In 1842 he was created lieutenant-colonel; and in 1844, on the recommendation of Bugeaud, he became colonel of the 32nd regiment. During the next three years he was constantly in the field; his reputation increased, and he was made major-general in 1847. In 1850 he was appointed to command the province of Constantine, which was then in a very unsettled state; but he subdued the whole country within the year. In the early part of 1851 General Saint-Arnaud was despatched on an expedition against the Kabyles, which was entirely successful, and was considered one of the most brilliant campaigns of the French in Algeria. His little army did not amount to 7000 men, and with this he overran that rugged country, and in spite of a desperate resistance he conquered the whole province. This was the service which fixed upon him the attention of the President of the French Republic.

Saint-Arnaud returned to Paris in the autumn of 1851, as General of Division.Louis Napoleon at once took him into his confidence, giving him the command of the second division of the army of Paris immediately after his arrival, and then appointing him minister of war. He acted cordially with the French President; "Nothing," he wrote to his mother, November 19, 1851—"nothing at all, you understand, is wanting, but to go straight forward and be bold." In the famous coup d'état of the 2nd of December following he was the President's chief adviser and instrument. Honours now accumulated on him, he was made marshal of France, then a senator, and received the grand cross of the Legion of Honour in 1852. His health had gradually declined under so harassing a life; yet he so strongly solicited the command of the French army intended for the east, at the outbreak of the war with Russia, that his request was granted. The events of that war are so well known that we need not dwell upon them. It will be enough to say that Marshal Saint-Arnaud entered upon it with the utmost eagerness. He evidently felt that a splendid chance was afforded of professional distinction. For a time his impetuosity enabled him to bear up under his constantly-increasing malady. The landing in the Crimea, which he calls his favorite idea, he tried to the utmost to hasten forward; and fearing at last that his health was endangered, he instinctively returned to the peacefulness of his opinions of his colleagues. On the morning of September 20, 1854, Marshal Saint-Arnaud mounted his horse with great difficulty, and by the constant exercise of great spirit sustained all the fatigues of command during the battle of the Alma. He exhibited the same energy in his despatch after the victory, but the intensity of his feelings is only fully seen in his letters to his wife, published in the collection referred to below. But the effort proved too much for his remaining strength; his malady increased daily, and on the 27th he was obliged to embark on board the Berthollet to return to Constantinople. He died on the 29th of September, 1854, whilst yet on his passage.

The career of Marshal Saint-Arnaud, almost up to the outbreak of the Russian war, showed him too much in the light of a daring and not very scrupulous adventurer; and he did not live long enough, when a nobler field was opened to his ambition, to show whether he possessed the abilities of a great commander. In the literature of the period he was earlier, he exhibited the most brilliant and daring courage, combined with judgment and energy, devotion to his duty was never so strongly evinced as at the close of his career. Two volumes of his private letters have been published by his brother, 2 vols. 8vo. London, 1855, which, though exhibiting many suppressions, give much curious information respecting the last twenty-five years of his remarkable career.
SAINT HYACINTHE. [Canada, S. E.]

SALICARIA, a genus of Birds belonging to the family Sylviidae, and separated by Mr. Selby from the genera Locustella and Sylvia. "The rounded form of the tail," says Mr. Yarrell, "the outer feathers being much shorter than those in the middle, and the paridity of these birds to moist situations, may be considered as the chief distinguishing character, and the Red Warblers, appear to separate them from the Sylvian Warblers." There are four British species of this genus.

S. locustella, the Grasshopper Warbler, is so called from its very peculiar almost incessant cricket-like note. It comes to this country from the south, and appears about the middle of April, and departs in September. It is a shy bird, keeping at the bottom of a hedge, and creeping along more like a mouse than a bird. It feeds on small suails, slugs, and insects.

S. phragmitis, the Sedge-Warbler, Sedge-Bird, is found during the summer in thick patches of reeds orwillows, in marshes, or on the low sides of rivers, or on islands. Like the last, it is a summer visitor, arriving in April and leaving in September. While of Belgium first observed its power of imitating the notes of other birds, as well as of its occasionally singing at night. It measures 4½ inches, and is somewhat a l-is bird than the last. It is also called, the Willow Locustella. It is a rare bird in this country, but like the group to which it belongs, it frequents moist and shaded situations, among reeds and bushes, near water.

S. armata, the Reed-Warbler, the Night-Warbler, this little Warbler was found in company with the Sedge-Warbler, but is not so numerous in this country as that bird. It arrives here in April and departs in September. It sings usually in the day, but sometimes at night. The characteristic sound of the bird, the entire absence of the body while stripe over the ear-coverts, and the uniform colour of the whole of the upper surface of the bird of this bird, distinguish it from either the Grasshopper-Warbler or the Sedge-Warbler, both of which however it has manly habits in common.

SALTORES. [Antrim, S. E.]

SALVANDY, NARCISSE-ACHILLE, COUNT DE, was born, in the department of Gers, June 11, 1798, but was sent to Paris in early youth, and educated at the Lyceé Napoleon. He enlisted as a volunteer in 1812, and served with so much distinction during the campaigns of 1812-14, that on the 8th of April, 1814, the emperor bestowed upon him, with his own hands, the decoration of the Legion of Honour.

After the restoration of the Bonbons, in 1814, M. de Salvandy was made an officer of the royal household, and in March 1816, attained Louis XVIII. to the frontiers. About this time, in his twentysixth year, he began that long series of argumentative pamphlets, for which he afterwards became so celebrated, by the publication of two brochures, one called 'Mémoire sur les Griees et les Voix de la France,' the other 'Journal des Deux Chambres de Mai, 1816' he brought out 'La Coalition et la France,' in which he displayed considerable talent. It produced a great sensation in more than one court.

In 1823 he became a member of the conseil d'état, holding the office of Maire de Roquefaret. But he was incapable of submission to any control. The measure presented by M. Barthelemi, on the 'Loi des ELECTeurs,' appeared to him an organic change unfavourable to the constitution; he therefore published his 'Voes Politiques,' in which, regardless of place and emoluments, he fully described the nature of political parties, their power, influence, and objects. This act of independence was followed by several others, as the restored family wished to advance in their system of aggranements with public liberty, parti this, and the "Dangers de la situation presente," produced a rupture between him and the ministry.

In 1834 M. de Salvandy went to Spain, and shortly afterwards married Madame Chabert, the journal of whose interest was a work of more than usual length, "Don Alonzo, on L'Espagne," comprising a full account of the Peninsula, and its various political changes. It was in the course of the same year, 1834, that he began to write his well-known "Histoire des Conventions," the most complete yet produced. The work, which at that period were entitled 'Les Funérailles de Louis XVIII.,' and 'Le Nouveau Règne et l'Ancien Ministère,' recommending a course of constitutional policy to the electorate, and containing the discussions of the period of the "Journal des Debats," is the most complete and laboured of all his books, and other independent political writers, he steered a middle course between the opposite parties, and flattered neither of them. Ever constant to his principles, and equally averse to abridgment,
troy rule and anarchical divisions, he maintained for forty
two years the same moderate opinions of equity and justice.
In all his writings he took for his basis the maxim—there is no
security for France but in constitutional monarchy. His
style is energetic, and his arguments are expressed in warm
language; yet he never abandons the fundamental principle;
notwithstanding the strong measures adopted by the French
government to embarrass him, especially by the revocation of
the Edict of Nantes.
In 1837, during the short liberal ministry of M. de Mar-
tignac, M. de Salvardy was created Conseiller d'Etat, on
which occasion Charles X. said to him: "You must admit
the civic virtues of the Good Old Days." The constitution of
the Polignac cabinet was formed, in 1839, he resigned imme-
diately.
From 1830 to 1848, during the whole reign of Louis Phi-
lippe, M. de Salvardy continued to publish his separate
pamphlets, and his articles in the Journal des Debats. Am-
ongst these few have been more admired than his "Seize Mois;
ou la Revolution de 1830 et les Revolutionnaires." M.
de Salvardy became a deputy in 1833, when he observed the
same course of moderate and liberal policy as in his writings.
He was more than once called to fill some of the highest
ministerial offices of state, during the reign of the Citizen
King. He likewise became a member of the French academy,
and was created a count. After the coup d'etat, in Decem-
ber, 1851, he became a delegate of the United States, and
was deprived of office and banished from the country, in
1852, and admission to France was only restored to him
after his renunciation of American citizenship in 1856.
He died December 15, 1856, at the age of sixty-one.
SAN DIEGO. [Califomia, S. 2.]
SAN FRANCISCO, a city, port of entry, and the capital of
the State of California, United States of North America, is
situated on a narrow neck of land forming the southern
side of the entrance to San Francisco Bay, and be-
tween that bay and the Pacific Ocean, in 37° 47' N. lat.,
122° 26' W. long. The date of its foundation, which was only 156 in
1642, is the same as the Census of the United States in
1850; but in 1858 it was, according to the State Census,
34,776, of whom only 5245 were females. The govern-
ment of the city is vested in a mayor, recorder, aldermen, county
assessor, and treasurer.

The sudden rise of the present city of San Francisco, is
perhaps the most remarkable on record. But the place is
not devoid of interest in other respects, being one of the ear-
liest settlements of the old Spaniards for the charitable purposes
of converting the Indians to Christianity. Their fort, or strong-
held, called the Presidio, was fixed near the entrance of
the bay, on the southern shore, about half a mile inland. It
was a square inclosure, the sides of which were about 300 yards
in length, surrounded with ramparts and ditches, and a wall
of planks; wells lighted, and watched; and arrangements
were made for their sanitary supervision. Several of the
public buildings and churches are comparable with those in
Francisco, and surrounded by a number of houses and
places of amusement or dissipation, including not a few
game-houses of various grades. The manufactures of the
city are comparatively inconsiderable.

The commerce of San Francisco is very great.

The bay, which is 8 miles wide, affords excellent anchorage,
and is the natural outlet, not only for the almost unparalleled
mineral riches of California, but of a district the extreme
ferility of which has as yet hardly begun to be developed.
The city fronting the bay is few lined with wharves and
quays, and vessels of great burden can lie alongside to land
and take in their cargoes. Steamers are in regular and con-
stant communication with New York and the Atlantic ports,
and in consequence San Francisco has quickly passed be-
than San Juan de la Frontera, one of the provinces of
the Argentine Confederation, South America, extends
between 30° 30' and 32° 30' S. lat., 67° 30' and 70° 20' W. long.
It is bounded on the north by the Andes, on the west by the
province of La Plata, on the east by the Republic of Chili,

The zone lies to the north of Mendez, which it re-
sembles in general description. [Plata, La States of.] The surface of the country is described generally
under Plata, La. Extending along the eastern declivity of the
Andes, San Juan comprehends the northern part of the
Vale of Uspallata and a large portion of the plain which
separates the Pampa Hanga from the mountains of Cordova,
SAN

and contains the Lakes of Guanacoche. The Vale of Uspalata is barren and nearly uncultivated. The soil of the plain consists of sand, and is without grass, but covered with stunted prickly trees of the mimosa kind. It is quite barren, and produces no kind of grain or vegetables, except where it is watered. About the outlet of the Lluta River from the city of San Juan, there is some of its minor affluents. This irrigation renders the land exceedingly fertile; without any other manure, they produce most plentiful crops of wheat and maize. The ordinary crops of wheat are fifty for one, in height, and about four inches in diameter. About 6 leagues north of the city of San Juan, they have been two hundred and even two hundred and forty. The distance from a market and the difficulties attendant on the transport of heavy goods through the sand, greatly diminish the value of the land.

But as fruit trees, especially vines, succeed very well in this soil, wines and brandies are exported to a considerable amount. In the northern district, called Jacial, there are some gold-mines, whose produce is however not very great. Like the other provinces of the Argentine Confederation, San Juan is a federal state, owning little dependence on the central government. The executive power is vested in a governor, elected by the juntas, or provincial assembly.

San Juan, the capital of the province, is situated on the Rio de San Juan, in 31° 4' S. lat., 64° 57' W. long.: population about 7000. It contains the government house and other public buildings, and has considerable commerce, being the point of exit for the silver and brass imported from the province, and exported, and from which foreign goods are distributed to the interior. In 1833 the city was nearly destroyed by an inundation of the Rio de San Juan, by which three churches and several other public buildings, with numerous private houses were thrown down, and many of the inhabitants lost their lives.

SAN LUIS DE LA PUNTA, one of the provinces of the Argentine Confederation, South America, extends between 31° and 33° S. lat., 64° 3' to 67° 30' W. long. It is bounded on the north by Salta, on the west by Buenos Ayres, E. by Cordova, S. by the province of Buenos Ayres, E. by the provinces of Cordova, La Rioja, S.W. by San Juan, and S.E. by Mendos. The area is about 36,000 square miles. The population is about 25,000.

The country included within this province is described under Plata, as States of. It comprehends that immense tract of country which extends between the provinces of Mendoza on the west and Cordova on the east. Its north-western part runs northward to the border of the Great Salina, and it reaches southward to the country of the Ticanes Indians, but now claimed by the province of Buenos Ayres. No part of it possesses any considerable degree of fertility. The greatest number of the widely-scattered and miserable habitations are composed of montane estancias, or cattle-farms, occur along the road leading from Buenos Ayres to Mendoza, in the hilly country, where tracts of sandy land alternate with ridges of hills and sandy deserts over which the cattle may wander. As the grass is coarse and long, the pastures are indifferently cut; still cattle and sheep are abundant, and are exported to a small amount, together with some wool. The corn and maize which are raised are not sufficient for the consumption of the scanty and widely-scattered population. The country between the Sierra de Cordova on one side, and Mendoza and San Juan on the other, is still worse. As no fresh-water stream runs through it, it cannot be irrigated; and with the exception of a small number of springs, it is a complete desert. The climate is dry and hot; rain and snow are scarce, and the season is extremely dry. About 60 miles N. from the city of San Luis, have ceased to be worked; but the people of the village till the alluvial soil at certain places in the neighbourhood, and collect annually a small quantity of gold, in dust and small lumps (peplis). Like the other provinces of the Argentine Confederation, San Luis is a federal state; the executive power being vested in a governor elected by the juntas, or provincial assembly, but for many years there has been no really effective government.

San Luis de la Punta, the capital of the province, is pleasantly situated on the western slope of a hill, 3247 feet above the level of the sea, in 33° 17' S. lat., 65° 48' W. long. It is built on a情节-like elevation of sand-hills, and does not contain more than 1500 inhabitants. There is no other place in the province above the rank of a hamlet.

SAN PAULO, the capital of the province of San Paulo, Brazil, South America, is situated on one of the head streams of the river Tiete, in the plain of Pirassununga, at an elevation of 2464 feet above the level of the sea, in 23° 33' S. lat., 40° 45' W. long. The population is about 22,000, exclusive of the suburbs. San Paulo is one of the oldest towns in Brazil, having been founded by a colony of Portugees in 1560. It is the bishop, a spacious cathedral, 150 years old, and the college of the Jesuits, etc., etc. The only manufacturing is a government establishment for making fire-arms. Some coarse woolen cloths and hats are made. San Paulo is the general emporium of the commerce of the plain in which it is situated, and is the centre of its trade, containing all the manufactories of goods of Europe and North America are imported. Santos, the port of San Paulo, is 45 miles S.W. from the city; and the descent to it is so steep that nearly all the traffic is conducted on the backs of mules.

SAN QUENTIN. [California, S. 2.]

SAN SALVADOR, Republic of, Central America, extends along the Pacific Ocean from the Bay or Gulf of Conquaguanos, 20 miles south of the Bay, between lat. 15° 10' and 15° 30', to the town of Santa Ana, in 14° 50' and 14° 30' lat., and bounded E. by Nicaragua, N. by Honduras, W. by Guatemala, and S. by the Pacific Ocean. The area is about 8800 square miles. The population is about 38,000.

The city of San Francisco, cut, in proportion to its size, the most populous, of the republics of Central America. The surface is very unequal. The main portion of the coast extends along the Pacific in a generally west-north-west and east-south-east direction for about 140 miles; and on the west side of the city of Conchagua, and is extensive and safe, these harbours are, properly speaking, only open roadsteads, hardly accessible during the rainy season and the prevalence of the south-winds. As far northward as Libertad the shore is bordered by a narrow tract of low and generally level land from 10 to 15 miles wide; but farther north, up to Bouconost, the coast is more elevated and broken. The interior is very rugged, being broken by several short ranges of mountains of moderate height, but separated into distinct groups. About 15 to 18 miles south of the coast, is an old volcano, the active portion of it being 5000 feet high, and formed of volcanic stones, the most destructive; but Ysla is by far the most remarkable, from its unceasingly active condition, surpassing it in size, and in the imparlancy of its eruptions, any other volcano in America. Neither of the other volcanoes has exhibited a more active period of life, and have made no severely destructive eruption.

The rivers of San Salvador have only a short course, and are in their natural state of little importance; though it is asserted that they might easily be rendered of great service for irrigation, and some of them be made navigable for barges and other small craft. The chief river is the Lempa, which rising in Esquipulas, in Guatemala, forms a short distance the boundary between Honduras and San Salvador, receives the outflow from Lake Guija, whence crosses the eastern end of the Cordova province across the Rainbow mountains, and falls into the Conchagua at times being little to the westward of the Bay of Jiquilisco. It is a deep but rapid stream, and the bar at its mouth prevents vessels of even moderate burden from entering it. The other larger streams are the Rio de Paz, at the western extremity of the republic; the Jiboa, which falls between the Lempa and Port Libertad; and the Sirama, or San Miguel, all of which have their mouths obstructed by sand-bars. There are two lakes of some size in the state. The Lake of Guajuma, on the western bank of the Cordova province, is a circuit of about 80 miles, and is one of the principal feeders of the Rio Lempa. It is said to communicate with a subterranean channel with the much smaller Lake of Metapa. Lake Yopango, about 6 miles E. from the city of San Salvador, is a small tributary of the Jiboa. Mineral- and thermal-springs occur very numerously in various parts of the country.
Owing to the great inequality of surface, there is considerable variety of climate. As a whole, it is warmer than in Guatemala; but it generally regarded as healthy. The hotest and least healthy part is the low tract along the coast.

San Salvador has great agricultural capabilities. The soil is generally good; and in some parts remarkably rich, and the climate permits a considerable variety of crops to be profitably cultivated. The inhabitants are industrious races. Of their produce they export to the different parts of Central America. Nearly all the available land in the country is appropriated to individuals, and much attention has been paid to its cultivation, though now, from the long continuance of civil dissenion, agriculture is in a very neglected condition. Maize is cultivated to a considerable extent; wheat succeeds well only in a few places; several varieties of frioles, and most of the usual vegetables, are raised for the ordinary food of the people. Oranges, lemons, pineapples, plantains, and various fruits are extensively grown; sugar, cacao, coffee, tobacco, and cotton succeed very well, and might, were the country in a more settled state, be raised largely for exportation. Since the gold discoveries in California, a very large quantity of sugar has been grown in the northern part of the republic, and almost all the cacao, and most of the export tobacco is from this section. The coast west of Point Libertad is commonly known as the Balsam Coast, it being the only place where the article known as the Balsam of Peru is collected. This part of the coast is the most productive of the country, and the chief market for its products. There are large forests on the slopes of the mountains of the interior.

Cattle are numerous, and of a good breed; sheep do not so well; and hogs, on account of the great extent of swamps, are very scarce. There are but a few ducks and geese. An inferior kind of cheese is made in large quantities; butter is seldom made.

The mineral wealth of the state appears to be considerable, but it has been imperfectly developed. Gold has been obtained in several places. Some rich silver-mines were formerly worked, but, owing to the general insecurity of life and property, they have been for many years almost entirely neglected. Excellent iron-ore is obtained near Metapa, 15 miles south of Santa Ana.

The only manufactures are of the common articles of domestic consumption. They consist chiefly of coarse cotton goods, cutlery, and iron ware, and some of them used to be exported to the coast of Mexico. The trade of the republic with foreign countries is of comparatively little importance.

The exports in 1863 amounted in value to 700,000 dollars; the imports to 1,200,000 dollars.

San Salvador is divided into four departments, which are named after their respective capitals—San Salvador, San Vicente, San Miguel, and Santa Anna. In all, the republic contains 6 principal towns, 142 smaller towns, and 62 villages. The following are the more important places: the population being a loose approximation.

San Salvador, the capital of the republic, is situated on the Rio de Asisbata, a small affluent of the Lempa, in 13° 44' N. lat., 89° 5' W. long. The site of the city is more than 2000 feet above the level of the sea, on undulating ground, in a kind of valley, surrounded by high hills covered with wood, among which, in a north-eastern direction, and at a distance of about nine or ten miles, is the volcano of San Salvador, which at different periods has caused great devastation by its eruptions. The city itself was laid out with considerable regularity, and had in the centre a plaza surrounded by four squares, three sides of which were lined with shops, with porticoes before them, supported by a colonnade; while on the other side was the cathedral, an edifice which had no great claim to architectural beauty. The population of the city in 1861 was about 10,000. But from the night of the 16th of April, 1854, the city was entirely destroyed by an earthquake, and a very large number of the unfortunate inhabitants killed.

For several days previous to the sad catastrophe there had been slight tremblings of the earth, but as they caused no mischief, little heed was given to their premonition. On the evening of the night named however the shocks became more frequent and severe, and, being unattended with noise, the inhabitants became seriously alarmed, and many of them assembled in the great square. At length at 11 o'clock, a violent heaving motion of the earth occurred, which, in a few seconds levelled the cathedral, churches, university, and every other public building in the town. Whole blocks of warehouses were torn down; these were rendered uninhabitable; and the wells and fountains were either filled or dried up. Many of the inhabitants, as we have said, perished, and of the survivors many fled to other towns. The movements of the earth continued for several hours, and at length the government of the republic, in his address to the departments calling on them to assist the destitute citizens, intimated that measures were to be immediately taken for the selection of a better site on which to rebuild the city. Some manufacturers of iron, especially of cutlery and coarse cotton stuffs, were carried on in San Salvador; and some sugar and indigo for exportation. Sugar-plantations are numerous in the neighbourhood, as are also extensive orchards. Mannagos, or plums, oranges, lemons, and grapes, grow in the vicinity of the population. Near the city there are some warm and some cold rivulets, which afterwards converge, affording the inhabitants the advantage of having natural baths of every degree of temperature.

San Miguel, some distance east of the Rio Lempa, population about 7000, is noted for its fairs, of which the most important is held in November after the indigo crop.

San Vicente, on the right bank of the Lempa, contains about 5000 inhabitants. At the beginning of the year 1860, it has in its extensive plantations of indigo and sugar; in the mountains near the town are iron-mines, which were formerly profitably worked.

Sonsonate, near the western town and its suburbs. In the vicinity of the city, population about 8000, carries on as present considerable commerce by means of the port of Acayutla, exporting sugar to Peru and Chili, and rum, &c., to California. The Indians inhabiting the country about the town make very beautiful mate, which are also exported. In the neighborhood of Sonsonate is the Yalco, a very active volcano.

Other towns of less importance than those above mentioned are—Acaqucha, Apacatpeque, Cotzpeque, Metapa, Sacaatocalco, &c.

San Salvador is a republic with a legislative chamber of 25 deputies, but the government is really vested in the president.

The history of San Salvador is similar to that of the other republics of Central America. [Costa Rica, &c.; Guatamala, &c.; Honduras, &c.; Nicaragua, &c.]

The government of the republic of the United States of Central America, San Salvador became one of the federal states, and its capital was made the seat of the federal government; but the union was speedily dissolved, and San Salvador, like the other states, became an independent republic, and like them, its progress has hitherto been arrested by constant internal discord.

(Sources, History of Guatemala; Haeckens, Reise nach Guatemala; and Central America; Daily, Central America, &c.)

SANA is the capital town of the province of Yemen in Arabia, situated in 15° 8' N. lat., 45° 8' E. long. Sana, though the chief town of Yemen, is the seat of an independent chief, the Imam of Sana, who exercises authority over a wide district around, and is the representative of the Egyptian government, which has advanced its frontiers to Beit-el-Fakhil, a town in the Jemeah, about midway between Sana and the port of Mokha, on the Red Sea. Sana is pleasantly situated on an elevated table-land, surrounded on three sides by hill ranges, and its roads connect it with some of the most distant parts of the Egyptian government are so great, that it has been said, that the traffic may be turned to Aden, to which port Sana is as near as to Mokha. Coffee forms almost the only export; the imports are piece-goods, thread, and twist, Persian tobacco,
glass, silks, spices, and sugar. The town is walled, and indifferently fortificated. It lies about 65 miles in circumference, with the usual coats of arms, but with more regular streets, and the more opulent having windows of stained-glass. The

Imam has two handsome palaces, both built of hewn-stone and fortified, in the towns, and there are about twenty large gardens, with fountains and public fountains. Across the principal street a handsome bridge has been thrown, as in rainy seasons a torrent runs down the street, but occasionally the town is seven years without rain, and is much too dry in general to be healthy. The population was 602 in 1838; and of these three

159,942

7,587,000

6,358,972

The province of Sarawak, which extends between 1° and 8° N. lat., 100° 40' and 111° 40' E. long. It is watered by the river Sarawak and its tributaries. [Borneo.] The capital, Sarawak, formerly Kechin, contains a population of about 18,000.

SARCOCCOLI. [CHEMISTRY, S. 2.]

SARDINIAN STATES. The dominions of the House of Savoy constitute a monarchy, the head of which derives his title of king from the island of Sardinia. A general account of the island and of its capital will be found in the next chapter; to this we add the more recent information. These states consist of—

1. the duchy of Savoy; 2. the principality of Piedmont; 3. the duchy of Genoa; 4. the county of Nice; 5. the island of Sardinia. The latest information has been obtained from 19,775 square miles. The population in 1848 was 1,579,915.

The total area of the kingdom, including the island of Sardinia, is 20,075 square miles (about one-seventh of the area of France), and the total population in 1848 (the latest census) amounted to 4,918,084 (less than one-seventh of the population of France at the census of 1861). The continental territories are divided into 11 administrative divisions and 30 provinces; the area and population of which are given in the following table—

<table>
<thead>
<tr>
<th>Province</th>
<th>Area in Square Miles</th>
<th>Population 1848</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torino</td>
<td>1,117</td>
<td>411,899</td>
</tr>
<tr>
<td>Susa</td>
<td>493</td>
<td>138,233</td>
</tr>
<tr>
<td>Genoa</td>
<td>344</td>
<td>56,541</td>
</tr>
<tr>
<td>Novi</td>
<td>269</td>
<td>65,013</td>
</tr>
<tr>
<td>Levante</td>
<td>261</td>
<td>75,859</td>
</tr>
<tr>
<td>Savona</td>
<td>311</td>
<td>78,566</td>
</tr>
<tr>
<td>Alba</td>
<td>192</td>
<td>36,331</td>
</tr>
<tr>
<td>Saluzzo</td>
<td>622</td>
<td>168,542</td>
</tr>
<tr>
<td>Alessandria</td>
<td>352</td>
<td>117,870</td>
</tr>
<tr>
<td>Asil</td>
<td>381</td>
<td>156,065</td>
</tr>
<tr>
<td>Novara</td>
<td>538</td>
<td>176,689</td>
</tr>
<tr>
<td>Ponzano</td>
<td>812</td>
<td>64,030</td>
</tr>
<tr>
<td>Osola</td>
<td>521</td>
<td>36,331</td>
</tr>
<tr>
<td>Forca</td>
<td>299</td>
<td>34,729</td>
</tr>
<tr>
<td>Ivrea</td>
<td>502</td>
<td>168,561</td>
</tr>
<tr>
<td>Asta</td>
<td>1,233</td>
<td>81,289</td>
</tr>
<tr>
<td>Vercelli</td>
<td>877</td>
<td>124,680</td>
</tr>
<tr>
<td>Cusano</td>
<td>385</td>
<td>120,498</td>
</tr>
<tr>
<td>Chambray</td>
<td>634</td>
<td>152,468</td>
</tr>
<tr>
<td>Moriana</td>
<td>748</td>
<td>64,239</td>
</tr>
<tr>
<td>Tarassaco</td>
<td>545</td>
<td>45,723</td>
</tr>
<tr>
<td>Amegli</td>
<td>1,076</td>
<td>107,474</td>
</tr>
<tr>
<td>Calchie</td>
<td>350</td>
<td>57,562</td>
</tr>
</tbody>
</table>

Total | 19,774 | 4,918,084 |

An account of these divisions and their chief towns is given under their respective heads. SARDOVIA, administered by a governor called Intendant, appointed by the king. The province is an aggregate of communes; each commune has a salsone, or mayor, who is subordinate to the intendant. For judicial purposes each commune has a justice called Tribunale, who sits in the chief towns. The provinces are divided into districts called Mandament, in each of which there is a justice of the peace, who has a secretary. There are in all 413 of these mandament. There are four supreme courts, which are also courts of cassation. The supreme council is the highest authority over all the provinces on the Italian side of the Alps and north of the Ligurian Apennines. The jurisdiction...
of the High Court of Genoa extends to all the provinces of the duchy of Genoa, with the exception of San Remo. The High Court of Nizza has jurisdiction over the provinces of Nizza, Oneglia, and San Remo. The High Court of Savoy, which sits at Chambéry, decides all suits within the limits of the duchy of Savoy, except those of a criminal nature, civil and the other for criminal matters. The judges are irremovable. There is an Admiralty Court which sits at Genoa; and tribunals of commerce are established in all the larger towns. The tribunals of commerce of Nizza, Genoa, Chambéry, Savona, San Remo, Genoa, Marseille, Tende, Toulon, and Nice are called Consolati. The towns and other communes have a communal council composed of notables of the place, at the head of which is the syndic. The council suspends the laws of the kingdom; and, in case of necessity, the commune, but its acts are subject to the sanction of the intendants of the province.

The government until lately was an absolute monarchy. The late king, Carlo Alberto, published a constitution for his subjects, dated February 8, 1849, which has since faithfully acted upon. It declares the Catholic religion to be the dominant religion, but gives perfect freedom of conscience to dissenters. The executive is vested in the king, who acts by decrees until Parliament meets; and it is his right to make proclamations or to make appointments to office, to sanction laws, also rest in the king. The legislative power is exercised by the king and two chambers—a Senate and Chamber of Deputies—which must be convoked every year by the king; and the Senate must be renewed in each chamber within four months. All financial laws must first be introduced into the second chamber. The freedom of the press and of the person is guaranteed. The judges are irremovable.

The army is recruited yearly by means of a conscription. Every conscript, unless he provides a substitute, is bound to serve eight years in the regular army, after which he is enrolled for eight years more in the provincial battalion of his respective district. In time of war, the provincial battalions are called into active service, and the army becomes thereby increased to about 150,000 men. The regular army in 1864 numbered 47,284 men and 7608 horses. The corps of carabiners, in number about 4000 (of whom 880 are in the island of Sardinia, which is free from the conscription), are charged with the police of the country, being scattered in detachments over the various provinces. In 1855 the army was increased in consequence of the king sending 18,000 men to aid the French and English against Russia in the Crimean war, 1857, 46,475.

The naval force consists of 4 sailing and 4 steam frigates, 4 corvettes, 3 higantines, 1 brig, 6 war steamers, and several smaller vessels, carrying in all 490 guns, and manned by 2860 men. The fleet is divided into three squadrons—those of Genoa, Villarfranca, and in the island of Sardinia. The mercantile navy numbered in 1857 2934 ships, carrying an aggregate of 197,924 tons, and 31,967 men, including captains, sailors, and workmen.

The public revenues of the state, as estimated in the budget of 1867, amounted to 138,957,321 francs; and the expenses to 147,326,686 francs. The national debt on the 1st of January 1861 amounted to 680,905,040 francs (27,528,300l.), including the loan guaranteed by the British government in 1858. The revenue is derived chiefly from land-tax, customs and excise duties, post-office, public works, &c.

The ecclesiastical administration of the central state is under the 4 archbishops of Turin, Chambery, Genoa, and Vercelli; 7 bishops; 16 vicars apostolic; 144 priests, 83 monks, 109 nuns, 80 deacons, 777 secular clergy, and 579 religious. The Sardinian Chambers in May 1865, all religious orders are suppressed, with the exception of those employed in "teaching, teaching, or tending the sick." The Vaincesans are the most numerous Protestant sect as yet in the Sardinian state. The Sardinians are particularly attached to the study of Geneva or Lausanne in Switzerland. They have churches in Genoa and Turin. Public instruction is afforded by the royal and communal colleges. In every province there are 1 or more royal colleges, in which grammar, rhetoric, and philosophy are taught; and in some of them there are chairs of law, medicine, and divinity. In most towns there is a communal college, besides grammar schools. Female education is afforded almost exclusively in the hands of nuns, of which there are forty-two in the kingdom. Scientific instruction is given in the two universities of Turin and Genoa, in which cities there are academies of sciences and of the fine arts. [Genoa; Turin.] There is a veterinary school at La Veneria near Turin, a school of telegraphic telegraphy at Turin. In 1848-50 a naval school at Genoa. Most communes have schools for boys.

The continental states of the king of Sardinia have several small carmine roads crossing the Alps, which intersect their territory. The most remarkable are:—1, the great road of Mont Cenis, leading from Chambery to Turin, constructed by Napoleon; 2, that of the Simplon, leading into Switzerland, likewise constructed under Napoleon; 3, the road from Genoa to Sarrans and Lecons along the Eastern Riviera; 4, the road from Genoa to Novi by Serravalle; 5, the road Della Cornice, from Genoa to Nizza, along the Western Riviera, begun under Napoleon, and finished under the king; 6, the road from Chambéry, which, under Louis XVI., was projected to form a connecting road between Montmellian and the Simplon; 7, the road from Turin to Genoa through Alessandria; from Turin to Cuneo, to Pignerolo, and to Susa; from Alessandria a line runs up to Novara. Along these roads electro-telegraphic wires are laid down and the city of Turin has electric communication across it. The construction of the Simplon line of Spexetia with the island of Sardinia, from the south-western point of which it has been proposed to carry electro-telegraphic cables to Bonis in French Africa. A railway is projected from Annecy, by chambery, to chambery, to Montmellian, and on the istre, up the left bank of the river to the confluence of the Arc, and up the valley of the Arc to Modane. This line in all probability will be extended from Annecy to Geneva, from Montmelian to Grenoble, so as to form a junction with the French railway system; and the project is to cut through the Alps under Mont Cenis, so as to unite the Savoy railroad at Modane with an extension of the Turin-Susa line to Grande-Croix, which has been long entertained with great favour by the people and government of the Sardinian state.

The plains of Piedmont are well supplied with canals, chiefly for the purpose of irrigation, the principal of which are in the provinces of Alessandria, Vercelli, Biella, Casale, Ivrea, Alba, and Turin. The river system of Piedmont is described under Po.

The staple products of the continental Sardinian territories for exportation are—silver, rice, hemp, wine, and oil. Most of the wine is consumed in the country. The principal manufactures consist of paper, silk, woollens, laces, glass, and cotton-yarn. The importation of colonial articles and foreign manufactures takes place chiefly through the port of Genoa. A considerable trade is carried on with Switzerland and Germany by the Lago Maggiore, and the Bernardino road leading to the Grisons.

The Sardinian States have Switzerland on the north, France on the west, the Mediterranean on the south, Austrian Italy, Parma, and Tuscany on the east. They comprise the provinces of Ivrea, Casale, Biella, Alba, Turin, and the Ticino. The Sardinian portion of the Lucania lies east of the Magna. The surface is covered on the west and north by the Alps, on the south by the Apennines, and between these two great mountain systems lies the most extensive and valuable of the valleys and plains that form the basin of the Po to the junction of the Ticino. The face of the country is described in the articles Alps, AYENHUS, GENOA, PIEMONTE, SAVOY, under the names of the several administrative divisions or provinces.

SATURNIA. [FOGOLARI, S. R.] SASIN. [ANTIOPE.] SATURNIA, a genus of Insects belonging to the order Lepidoptera, and family Bombycidae. The antennae are fringed in the male; the head is small; the wings are very broad and entire; the palpi and trunk are wanting.

S. Pavo, minci, the Emperor Moth, is one of the hand-
somest of the British species of Moths. It is about 3 inches wide. The colour is grayish-brown, faintly tinged with purple; the hinder margin of all the wings has a band of pale brown and purple, the hinder band being much waved. The centre of each wing has a large spot or occelus, which is placed on a light ground; it consists of a black pupil, with a yellow or gray iris, and partly surrounded by a light blue crescent. The lower band of the greenish wing, having a black band on each segment adorned with pink tubercles, bearing a whorl of six hairs diverging like a star. It constructs a curious cocoon, the extremity not being closed, but terminated by a converging circle of very stiff hairs, which enables the insect to make its escape from within, but completely prevents all ingress.

To the genus *Sternura* some of the largest of the *Lepidoptera* belong. *S. Atlas*, the Giant Atlas Moth, has wings measuring 7 and 8 inches across. This species also, with *S. Cerealis* and *S. Lysia*, have their wings produced into a tail. The cocoons of *S. Cyntha* and *S. Mykilla* are used in India for the production of silk. Latrielle states that these are the wild species of silk-worm of China. *S. Cyntha* is the Arrindi Silk-worm of India. (Boxburgh, 'Linn. Trans.,' vol. vii.) *S. Promethea*, a North American species, forms its cocoon within the leaf of a saussafra-tree, having previously fastened the stalk of the leaf to the stem by a strong silken web, whereby it is prevented from falling with the other leaves. (Weswood.)

SAURINS. The following is a synopsis of the families of the *Sauria*, adopted by Dr. J. E. Gray in his 'Catalogue of the Specimens of Lizards in the British Museum.' The generic and specific names of *Lacertididea* are given, the other large families are described under their proper names —

Order I. Lizards. *Sauria.*

Mouth not dilatable, jaws toothed, the lower jaw-bones being united by a bony nut in front. Eye generally with distinct eyelids; drum of the ear generally distinct. Limbs four, distinct, rarely in such a rudimentary state as to be hidden under the skin. Toes clawed. Body elongate, rounded, covered with imbricated or granular scales; ribs distinct, mobile, and with a distinct sternum. Tail elongate, tapering, rarely prehensile, generally covered with whorls of scales. Eggs with hard skin. The young not undergoing any metamorphosis.

Sub-Order I. *Leioptosauria.*

Tongue flat, elongate, and bifid.

Tribe I. *Cyclosaura.*

Scales of the belly square, in cross bands, of the back and tail rhombic and imbricate, or circular and subgranular. Tongue elongate, flattened, free, nicked, or with two elongate cylindrical horn-like tips. Eyes diurnal, with two valvar lida. Feet for walking, with unequal toes.

a. Head with small many-sided shields. Tongue sheathed at the base.

1. *Monotraca.*—Head-shields flatish, scales small. Inhabit the Old World and Australia. [Mohora.]

2. *Heloderma.*—Head-shields and scales of body convex, tubercular. Teeth with a groove behind. Inhabit the New World.

b. Head with large regular shields. Tongue mostly free at the base.

* Sides flatish, covered with small often granular scales.


4. *Lacertinae.*—Head pyramidal, covered with regular many-sided shields; super-orbital plate rigid. Throat scaly, often with a fold of hair, and of colour; neck, dorsal, and anal, of the same. Tongue elongate, flat, free at the base, erectile, long-foled. Teeth hollow, rounded. Scales granular or rhombic, keeled. Sides flat, covered with small granular scales. The species inhabit the Old or Eastern world and Australasia.

Synopsis of the Genera.

1. *Nostotel.* erect, in the lower hinder angle of the nasal shield, just above the labial shield, with one or two shields behind it. Eyelid distinct.

a. Toes simple, compressed, not keeled nor fringed. Collar distinct.

b. Scales granular or 6-sided, elongate. Posterior nasal shield single. Collar distinct.

Zoetes.—Lower eyelid scale, opaque.

Z. ocyphala. — Long-Headed Lizard, a species brought by Mr. Smith from Spain or Madeira.

Z. Taurica, a native of the Crimean, Morocco, and Sicily.

Z. leovia, the Striped Lizard, a native of South Africa.

Z. Berbiana, a native of Australasia.

Z. Galotti, Madeira.

5. Scales granular or 6-sided, elongate. Posterior nasal shields 2, small, one above the other. Collar distinct.

Lacerta.—Lower eyelid opaque. Chin-fold distinct. Abdominal shields narrowed behind.

L. viridis. — The Great Britain Lizard. It is the *L. stirpiaea* of Miller-Edwards and others. The upper hinder nasal small, rather in front of the larger lower one; scales of the temple small, unequal, irregularly many-sided, often with a larger central one; throat fold indistinct, brown, spotted or yellow with black; sides green, brown-eyelid, beneath white. This species is a native of Great Britain, and is especially abundant in the neighbourhood of Poole in Dorsetshire. Its general abode is on sandy heaths, where, from the rapidity of its movements, it is often taken for some form of snake. On account of the rapid locomotion it is not often caught. It does not bear confinement, but pines away and dies. When caught it often bites, but no ill-consequences are the result.

The female lays her eggs to the number of 12 or 14 in hollows in the sand, which she excavates for the purpose. They are subsequently hatched by the heat of the sun. The eggs appear to be laid a considerable time before they are hatched. In this respect this species differs very much from the common lizard, which always brings forth her young alive. This lizard is larger than the *Zoetes niger*, as those of average size measure about 7 inches in length.

L. viridis, the Green Lizard, has the scales of the temple inequilateral, many-sided, with a central larger one; back granular, oblong, with shelving sides; throat-fold distinct. This species is a native of Guernsey and Jersey, and also of the south of Europe. It is much more readily caught than the last species, and never attempts to bite. It may be readily tamed and taught to come to the hand for food. It will lie coiled in the two hands, and never attempt to escape.

L. ocellata and *L. lervia*, both natives of the south of Europe, are the only other species of the typical genus *Lacerta*.

Thruss.—Lower eyelid transparent. The only species is *T. persepolitana*, a native of Algiers.

Terra.—Lower eyelid opaque. Chin-fold distinct. Abdominal folds and shields square. *T. punctata*, a native of Madeira, in Portugal, is a species.

Nucora.—Lower eyelid opaque. Chin-fold indistinct. Abdominal shield narrow behind. Preanal shields one below the other.

N. Landonii, a native of the Cape of Good Hope.

N. tanalata, a native of South Africa.
2. Plate of eyelids of toes.

N. exiguus and N. chalybeus, the Small Lizard and Steel-Black Lizard, are natives of the Canaceus.

c. Scales rhombic, keeled. Posterior nasal shields, small, one above the other.

*Notopholis.*—Collar and throat-fold distinct.

N. fitzingeri is a native of Sardinia.

N. Copena is a native of South Africa.

N. melanosoma inhabits the Morea.

N. nigropunctata, a native of the island of Corfu.

*Tropidosaurus.*—Collar and throat-fold distinct.

T. montana, a native of Java, is the only species.


*Algira.*—Ventral shields roundish, thin.

A. barbiora, the Zermoromet, is a native of Algiers.

A. Capensis and A. Dumoralis are natives of the South of Africa.


*Acantholacustris.*—Toes fringed on the sides.


A. Bidii. Found in Algiers.

A. Copena. South Africa.

A. Scorign. Algiers.

A. Lison-maculatus. Morocco.


A. inornata. Tripoli.

*Psammodromus.*—Toes not fringed on the sides. Collar indistinct.

P. Hispanius, the Garrines, is a native of Spain.

P. cinereus inhabits the South of France.

11. Nostril horizontal on the ridge, between three swollen scales, one between the nostril and labial. Toes keeled beneath or fringed on the side.

a. Eyelid distinct.

*Scapiterna.*—Toes depressed, fringed on the edge, not keeled beneath. Collar indistinct. S. granimina, a native of Nubia, is the only species.

*Erenga.*—Toes compressed, keeled beneath, not toothed on the edge. Collar distinct. Preanal shields small, in several series, in central series one behind the other.

E. arguta. The Arguta is a native of Tartary.

E. velox. The Crimean.

E. Kosnii. South Africa.

E. Copena; E. Burchelli; E. Forsellia; E. Namanganis; E. Inquabria, are also described by Dr. Smith as natives of South Africa.


E. lineo-ocellata. South Africa.

E. pulchella. South Africa.

*Mesita.*—Toes compressed, keeled beneath, not toothed on the edge. Collar distinct. Preanal shield single, semicircular, with 1 or 2 arched series of smaller ones round it.


Cubrita. Toes rather compressed, keeled beneath, not fringed on the sides. Collar none.

C. Lecheeanaulii, a native of India, is the only species.

b. Eyelid rudimentary. Eye circular, exposed.

*Ophiotes.*

O. elegans is found on the shores of the Mediterranean.

O. macobractaeus is a native of Asia Minor.

** Sides with a distinct longitudinal fold, covered with small granular scales.

5. Zonuridae.—Ears distinct. Limbs distinct, or rarely quite hidden.

6. Chalididae.—Ears hidden under the skin. Limbs very short; femoral pores none. Lateral fold indistinct. [Chalididae.]

*** Sides rounded, covered with scales like those on the back.


8. Chirolekidae.—Scales of the back imbricate, 6-sided, lanceolate, keeled, narrow, in cross series; of the tail in rings, alternating with each other. Ears hidden. Femoral pores distinct.


10. Chlorosariaeidae.—Scales imbricate, all elongate, rhombic, keeled in longitudinal series, the keels forming longitudinal ridges. Limbs simple, undivided. Temples scaly.

Tribe II. Griesauridae.

Scales of the belly and (almost always) of the back and sides quinquecennial, roundish, imbricate. Sides rounded. Tongue narrow, short, flat, and slightly nicked. Head with regular shields.

a. Eyes distinct, exposed, eyelid rudimentary. Head conical.


b. Eyes distinct, eyelids distinct, connivent. Head conical.

15. Scinisidae.—Rostral shield moderate, triangular. Nostrils in a plate between the frontal and labial shields.


17. Acotidae.—Rostral large, cup-like. Nostrils in the rostral, with a narrow slit to its hinder edge.

c. Eyes hidden under the skin.

18. Typhlimoridae. —Head conical. Rostral shield cup-like. Nostrils in the rostral shield, with a slit to its hinder edge.


Sub-Order II. Psychoglossa.

Tongue thick, convex, attached to the gullet at the base.

Tribe III. Nyctiura.

Scales of the belly small, rhombic, imbricate; of the back and sides granular. Tongue thick, short, convex, end slightly nicked. Eyes nocturnal; eyelids circular, not constrict; pupil linear, erect. Feet for walking; toes unequal, scaly beneath, and generally dilated.


Tribe IV. Sirobiloauru.

Scales of the belly small, rhombic, imbricate; of the back and sides imbricate. Tongue thick, short, convex, end slightly nicked. Eyes diurnal, with valvar eyelids; pupil round. Feet for walking; toes unequal. 21. Geckoida. —Teeth on the inner side of the jaw-bone. New World. [Swan.]

23. Agamidae.—Teeth on the edge of the jaw-bones. Old World and Australasia. [Dagonina, 2.2.]

Tribe V. Dendronauru.

Scales of the belly, sides, and back, granular. Tongue elongate, subcylindrical, worm-like, very extensile. Eyes globular, very mobile, with a small, central, round opening. Toes equal, united into two opposing groups.

24. Chameleoniidae.—Teeth on the edge of the jaw-bone. Old World. [Chameleons.]

SAUSSUREA, a genus of Composite Plants belonging to the sub-order Cynaroploclaeae. The florets are all herma-
phodite and tubular; the authors with oillated sets at the base; the involucres is imbricated and unarmed, the receptacles a few foam the upper of the genus consisting of short rough bristles, the inner one feathery.

*S. alpina* has a stem from 3 to 19 inches high, erect, downy, and simple, terminating in a small corymb of heads with pinkish florets and purple anthers; the leaves are lanceolate, with sharp points, and an inner involucel lanceolate, the upper ones sessil-ealy, all distantly toothed, the heads in a dense corymbe, the involucres subcylindrical, with depressed hairy scales. This is the only British species in the genus that is common in upland situations.

(From the *Manual of British Botany.*

**SAXIFRAGE. [SAXIFRAGA.]
SAXIFRAGE, GOLDEN. [CHRYSOPHYLLUM, S. L.]
SCARLATINA RHEUMATICÆ. [Phlegm, Practice of, unsettled.]**

**SCHADOW, JOHANN GOTTFRIED,** an eminent German sculptor, was born at Berlin in 1764. Passionately found of art when a boy, he was yet unable, owing to the poverty of his father, to obtain any instruction until a sculptor kindly offered to teach him. He soon mastered the rudiments of art, and eventually determined to devote himself to his teacher's profession. But having formed an attachment to a young lady, he fled with her to twenty-first century. There he produced his first work, of which the commencement of his fortune; for his father-in-law not only forgave the young couple, but furnished funds wherewith Schadow might proceed to Italy to continue his education. He remained in Rome from 1768 to 1788, chiefly occupied in the study of art. He then returned to Berlin and soon found ample patronage. The first important work executed by him after his return was the monument to Con von der Mark, natural son of Frederick William II, erected in 1789 in the church of St. Dorothy at Berlin. Among other great works with which his chisel has adorned Germany are the colossal statue of General Zieten in hussar's uniform; the equestrian statue of Frederick the Great at Göttingen; a life-size marble group of Queen Louise of Prussia, and the statue of the Duchessa di Cumberland; a statue of Duke Ludolph of Dessau for the Lustgarten at Berlin; an equestrian statue of Field-Marshall Blücher at Ros托ck; the monumental statue of Tatenstein at Breslau; that of Luther at Wittenberg; the quadripla on the Brandenburg Gate; and the sculpture on the Mint at Berlin: he also executed a considerable number of portrait busts of the most eminent contemporaries.

For many years before his death Schadow was regarded as the patriarch of the modern school of sculptors in Germany, as an evidence of the honor in which he was held, it deserves to be mentioned, that whilst the old man still lived, the street in which he dwelt in Berlin was called by his name. This is the way of the countrymen to break through the classic conventionalism of his predecessors, and, without departing from the sober dignity of sculpture in style, to add a more forcible expression of character, and a stricter adherence to the actual model in attitude as well as in drapery. His great excellence lay in portrait, and he had ample opportunities of putting forth his powers. Appointed professor in the Academy of the Fine Arts at Berlin some time prior to the close of the 18th century, he from 1822 to his death held the office of director of that institution, and among those who were successively his pupils are a large proportion of the best sculptors of Germany, including Rauch, Dennecker, Tieck, Zanner, &c., in most of whose works evident signs of his influence may be traced. Schadow continued from time to time to develop portions of his dёtrines in public addresses or in detached essays; but on the whole there was in those no important alteration of his philosophy as already given forth in the first fifteen or so of the present century. Meanwhile, as he had burst away from Fichte, so his old friend and associate Hegel had burst away from him. The germs of a difference between Hegel's philosophical teaching and that of Schelling continued to develop and finally to come out into the open as early as 1806. If not earlier; they had been developing in subsequent works of Hegel; and at length, in 1817—when Hegel was appointed to the Philosophy chair at Berlin, which had been vacant since Fichte's death—Hegelanism continued to develop different from Schellingism, as had dispossessed the system of Fichte. The struggle between Hegelianism and the natural Gestaltung of the Menschlichen Kopfes in Umrisse bildlich dargestellit! ("National Physiognomy, or Observations on the Differences of the Various Species of the Form of Human Heads, represented in Typical Outlines").

**SCHELLING, FRIEDRICH WILHELM JOSEPH,** one of the chief names of modern German philosophy, of which Kant, Jacobi, Herbart, Fichte, and Hegel are the other chiefs, was born at Leonberg in Württemberg, in 1775. He studied first at Tübingen, where he had Hegel for his college-fellow, and where the two future rivals in philosophy formed the friendship which was to last to the end of the younger man, was somewhat the older philosopher, and Hegel was first indoctrinated by him in philosophy. From Tübingen, Schelling went to Leipzig and Jena—his attraction to Jena being Fichte's philosophical lectures. He started as a materialist, but later became a religious critic and disciple of Fichte; and it was not till 1798—when, on Fichte's removal from Jena, Schelling succeeded him in the Philosophy chair of that university—that Schelling became aware of his own differences from Fichte's system. He had already been a contributor to Fichte's Jena Journal; but now, in preparing his own course of lectures, he necessarily enlarged his speculations. In 1798 he published *Erster Entwurf eines Systems der Naturphilosophie, zum Deutlichen und Erkennenden der Natur.* Some of his lectures themselves that he first effectively disseminated his new philosophical ideas. Hegel, who had in the mean time been living at Frankfurt-on-the-Main and elsewhere, now, among others, on the death of Schelling's first wife, was advocated in common by himself and Hegel—the two acting as joint editors of a journal, and Hegel appearing independently, in Schelling's interest, as the author of an essay on the *Difference of the Systems of Schelling and Fichte.* 

In 1802 Schelling fled from Jena for Berlin, where he lived, as he had succeeded Fichte; and in 1807 he removed from Würzburg to Munich, where he remained till 1841. By the year 1814, when Fichte died at Berlin, the philosophy of Schelling, who had then been seven years settled at Munich, may be considered as having gained the ascendancy throughout Germany, as a development beyond that of Fichte and superseding Fichte's system. This had been owing partly to the diffusion of Schelling's views by himself personally in the lecture-room at Jena, at Würzburg, and at Munich; but partly also to various scattered writings—some in the form of contributions to journals, some as reprints of the substance of his lectures, some as public addresses, and some as dissertation papers—each of which, regarded as a whole, was not without its influence on the thought of the time. Among the most important of these publications were the following:—"On the System of Transcendental Idealism," 1800; a discourse entitled "Bruno, the First of the Philosopher of the Doge," 1802; an essay entitled "Ideen in einer philosophischen Natur, als Einleitung in das Studium dieser Wissenschaft," 1813; "Darlegung des wahren Verhältnisses der Natur-Philosophie zu der vernichteten Fichtschen Lehre," 1806; a discourse, "Über das Verhältniss der bildenden und der menschlichen Kunst zu der Natur," delivered before the Royal Academy of Sciences in 1807; a work entitled *Von der Weltseele, eine Hypothese der höheren Physik zur Erklärung allgemeinen Organismus, nebst einer Abhandlung über das Verhältniss des Realen und Idealen in der Natur,* 1809; the first volume of a collection of his *Philosophische Schriften,* published in the same year; and a series of fourteen lectures, "Über die Verhältnisse der philosophischen Vernunft im System der Natur," published in 1813.

By the time of his death, Schelling had lived through the republication and the republication of his *Determinate in public addresses or in detached essays; but on the whole there was in those no important alteration of his philosophy as already given forth in the first fifteen or so of the present century. Meanwhile, as he had burst away from Fichte, so his old friend and associate Hegel had burst away from him. The germs of a difference between Hegel's philosophical teaching and that of Schelling continued to develop and finally to come out into the open as early as 1806. If not earlier; they had been developing in subsequent works of Hegel; and at length, in 1817—when Hegel was appointed to the Philosophy chair at Berlin, which had been vacant since Fichte's death—Hegelism continued to develop different from Schellingism, as had dispossessed the system of Fichte. The struggle between Hegelianism..."
According to Schelling, a knowledge of the absolute is the only true philosophy, and such knowledge is possible. But it is possible only to him who has attained a certain kind of understanding—by what he calls "Intellektual Intuition," which is a kind of falling back or swooning of human reason into the absolute as being identical with itself. If one can know the absolute, it can only be because man himself is identical with that absolute in the same thing as existence, because thinking and being are one. But this is but one aspect of the doctrine of the identity of thought and being, of the subjective and the metaphysical absolute. The words come to cognize only through identification with it, and which we may designate to be regarded in its original condition as neither object nor subject, neither nature nor mind, but as the union, the indissolubility, the immutability of both. It has become all in all, and the subject, which originally but insidiously is now continually justifying itself higher and higher, from the lowest manifestations of what is called matter, up to organic existence and the activity of reason itself in the guise of humanity. In this movement of Deity or the Absolute One, which constitutes the Life of the Universe, there are two modes—first, the expansive movement, or objectifying tendency, by which the absolute reaches forth, so to speak, into actual existence, and out of the natura naturata there arises the self-subsistent and creative natura naturans; and, secondly, the contractive movement, or subjectivising tendency, by which the natura naturans falls back on the natura naturata, and becomes conscious of itself. The foundation of the absolute as engaged in the first movement—that is to say, in activity more than in passivity—is, naturally, natural philosophy; and only when the philosophy of nature is so considered—that is, when nature is considered as so many successive potentiations of the absolute in the form of experience, can it be truly studied. A perfect intellectualising of the laws of nature into laws of intuition and of thinking would be the highest perfecting of the science of nature." Of this style of treating the laws of nature, as modes by which the absolute proceeds in the development of its own activity, there exists, Schelling himself set the example. He interpreted what is called inorganic nature, with its laws of gravity, light, magnetism, and electricity, as being the absolute in what he called its "first potencies," or working on in its first efforts for converting the possible into the actual. Even here the subjective and the objective were already differentiated, but objectivity predominated. Then came the second potencies, or potencies of chemism, representing a higher phase of the same activity. Here nature, with this succeeds the third potencies, of organically living nature, where we first see the aspect of consciousness or predominating subjectivity. Though Deity is immanent in all nature, it is in man the Deity becomes consciousness; and the highest phase of the third potencies, of man, is its identification with the infinite, and relapsing into the infinite. The ideal in man also corresponds to the real in nature; and in the perception of this is the true philosophy of art.

Schelling was the doctrine of 'absolute identity,' as it was propounded in Schelling's first or earlier philosophy. For a fuller view of the immense extention which he gave to it as affecting every possible department of thought, we must refer to his own writings; or to a very accurate and profound summary of Schelling's system given by Chalmers in his 'Historical Development of Speculative Philosophy from Kant to Hegel' (of which there are two English translations); or (for more popular purposes) to Mr. Morell's 'History of Speculative Philosophy,' vol. ii. pp. 161 to 165. There is a French work entitled 'Schelling; Esprit Philosophiques, et Moraux propre a donner une idee generale de son Systeme: traduit de l'Allemand par F. Bénard,' 1844. This work includes Schelling's lectures on the methods of academic study. His discoveries on the philosophy of art is accessible in English. (Chapman's 'Catholic Series,' 1844.)

Apart altogether from the scientific comprehensive philosophy which Schelling aimed, there was much in the spirit and phrasing of his system—in such phrases, for example, as 'the rhythm of the Universe,' the 'cosmic indistinctness of the external,' the 'immanence of Deity in Nature'—to captivate and fascinate. Schelling was a species of sublime Pantheism, accorded well with the tone of German thought as affected or determined
by Goethe, Tieck, and other poets. But, as we have said, the system did not meet with entire satisfaction even in Germany. On the other hand, Hegel had tried to tear it to pieces on the score of its substitution of enthusiasm and poetry for logic, and had promulgated a system which found more acceptance with harder minds; on the other, the re-awakened Christian sensibility, and the exigencies of the French Pantheon, leaving no room for that 'personal God' which the human soul demanded as essential to true religion, and, moreover, in its identification of man with deity, contradicting those notions of sin, redemption, and the like, which finds its home in the experience of humanity. Working his way against these attacks, or, at least, to re-issue his system in a form which would save it from attacks from the latter quarter, was Schelling's object during the last portion of his life. This object, later lying as it now does in an at least ascertainable, will be found in Chalybeus. Suffice it here to say that, by a peculiar modification of his theory of the absolute,—according to which modification he now manifested that, though nature and Deity were identical, yet nature might not he and was not co-extensive with all Deity, that is, that the absolute might be considered as being in all objects and yet as not being exhausted in all objects taken collectively, but as being moreover a certain force or fund of unobjectifiable will and reason,—Schelling imagined that man, the noblest of all creatures, combined within one body all the most peculiar part of Deity, and that 'what is immanent in nature is that in God which is least God himself,' he arrived at the doctrine of a 'personal God,' and also at the notion of 'human imperfection,' and moral evil, and so he reconciled his philosophy with the Christian, and sanctified the world's history as a fall from good and a divine recovery.

ScHirRHUS. [Phys, Praelections On, under Microscopic Diagnosis, &c.]

1837. An Argillaceous Rock, of a coarse laminated structure. [Slaty.]

Schnee Von KarolSfeld, Julius, was born at Leipzig on the 26th of March, 1794. His father, Hans Schnee von KarolSfeld (born 1784, died 1840), a painter of some celebrity in his day, was director of the Art-Academy at Leipzig, and Julius received his earliest instruction in art from him, though he was desirous that his son should adopt a different profession. But the boy displayed at an unusually early age such remarkable talent for art, and so earnest a desire to follow it, that the elder Schnee, by his own voluntary act, and at the age of sixteen Julius was entered a student in the Academy of Painting, at Vienna. There he distinguished himself, though the formal conventionalisms indulged in by most of the pupils of the Academy in Vienna, was of the greatest assistance in the development of his original genius. Happily in good time he proceeded to Rome (1815) where he at once attached himself to the society formed under the auspices of Cornelius and Overbeck, and when that remarkable cluster of young German painters brought their productions fairly before the artistic world, Julius Schnee was recognised as one of the most accomplished of the promulgating band. His work the 'Wedding in Cana,' attracted so much notice that he was chosen along with Cornelius and Overbeck to paint the walls of the villa Massimi at Rome, in the revived art of fresco, with designs from the trio of great Italian poets, Dante, Ariosto, and Tasso. To Schnorr was assigned Ariosto, and his designs were received with general approbation. He also produced works which were particularly admired and of which, if 'Ruth in the field of Boaz,' 'Flight into Egypt,' and other important works.

At Rome Schnorr had gained the friendship of Niebuhr, Humboldt, and Döll, by whom he was introduced to the monastic patronage of France, and to the two last-named crowned princes and afterwards kings of Bavaria. When Ludwig set about the construction of his magnificent works at Munich, Julius Schnorr was one of the artists he summoned to assist in decorating them. The paintings of Schnorr, both in the older and in the new buildings, were suspended in order to complete the decoration of that portion of the palace called the Fest-Saal, and great

SCHolS Feld, REV. JAMES, M.A. was born November 13, 1819, at Olden, Yorkshire, England. His father, Daniel Scholesfield, was minister of the Independent Dissenters' chapel, in that town. He was educated in the school of Christ's Hospital, London, became a Grecian there, and obtained several prizes. He was entered of Trinity College, Cambridge, and graduated B.A. in 1842, and M.A. in 1819, in that year obtained the Craven University Scholarship. He took holy orders in 1813, by special permission, before he had taken his degree of B.A. Soon afterwards, on proceeding to his degree, he attained the place of Senior Chancellor of the University of Cambridge of the Order of the Garter. He was then curate to Mr. Simeon, of Trinity Church, Cambridge. In October 1815,
He was a Fellow of Trinity College. Having taken his degree of M.A., he obtained in July 1823, by presentation of his college, the perpetual curacy of St. Michael's, Cambridge, where for thirty years he performed the duties of his sacred office with unwearying zeal and assiduity. On the death of Mr. Dobson, in October 22, 1852, Mr. Scholz was Regius Professor of Greek in the University of Cambridge. In 1827 he married, and in the same year he commenced the courses of lectures on the principal Greek authors, which, with no interruptions, he continued for a quarter of a century. In the latter part of his life he published a work on Ἀθηναῖον, Plato, Aristophanes, Thucydides, Sophocles, Demosthenes, and Pindar, returning to each, on an average, once in seven years. In 1844 he made a tour in Scotland, and there raised their applause by his learned and instructive discourses. On the 11th of November 1849 the church of St. Michael was burnt down. On the following day Dr. French, canon of Ely, died, and Mr. Scholz succeeded him in the canonry, the prebend being attached to the Regius Professorship of Greek. St. Michael's church was rebuilt, and was re-opened January 11, 1852. Professor Scholz's health, however, had been failing for some time, and he was ordered by his medical adviser to refrain from preaching, and take rest in some quiet and pleasant place. For this purpose he retired to Hastings, where he died, April 4, 1853. He was buried at Fairlight, near Hastings.

Professor Scholz's principal literary publications are as follows: In 1826 he published a new edition of Pearson's Eucharistia Mystica. In 1827 appeared his Pompeia Longiton. "Treatise on the Greek Article," an edition of Ἀθηναῖον, with notes critical and explanatory; and a new edition of Bishop Leighton's "Proleseia." His next work was 'Petri Pauli Dobree Adversaria,' containing Dobree's notes on the Greek Books of the New Testament and minor orators, of which Part I. was published January 1831; Part II. November 1831; and Part III. January 1833. In 1832 he published 'Hints for an Improved Translation of the New Testament,' and a "Commentary on the New Testament," in which the original Greek and authorised English versions stand side by side. In 1833 was published an edition of the "Eumenides" of Aeschylus. Several of his sermons have been published in a separate form.

(Memorials of the Rev. John Scholz, M.A., late of Trinity College, Regius Professor of Greek in the University of Cambridge, Perpetual Curate of St. Michael's, and Canon of Ely, by his Widow, with Notes by A Literary Character by the Rev. William Selwyn, M.A., Canon of Ely, 1850, 1851.)

SCHOLZ, JOHANN MATTHIAS AUGUST, was born at Karlstadt near Breslau in Prussian Silesia on February 8, 1794. He received his early education in the Roman Catholic gymnasium of his native town, and in Leipzic, where he studied theology and philology, and in 1814 gained a prize in the Roman Catholic theological faculty for his essay on the Parable of the Vineyard. Shortly afterwards he commenced his critical labours on the text of the New Testament, and with this object after he had for two years availed himself of the materials in the library of Vienna, in 1817-19 he visited Paris and London, Switzerland and Italy. In 1820, immediately after being appointed professor extraordinary of theology at Bonn, he joined the expedition under Minniel for the exploration of Egypt and the neighbouring countries. The travellers disagreed and parted, but Scholz journeyed through Egypt, Palestine, and Syria for four months, when he returned to Trieste. At Breslau in 1821 he took priest's orders, and in 1825 he was appointed professor of theology in the university and a canon of the cathedral. He died in November 1852. Among his principal works we may mention 'Reise in die Gegend zwischen Alexandrien und Ptolemais,' which was a selection from his diary, and was published in 1829. In 1826 he issued at Bonn his 'Communia de Gogalathae et Jesu Christi Sepulcri Situ,' in 1834 his 'Handbuch der biblischen Archäologie,' in which he collected the various theories which have been put forward on the subject, the text of the New Testament, under the title of 'Novum Testamentum Graecum,' in two volumes. Scholz's scholarship as a philologist has been generally acknowledged, and his labors are held in high estimation.

SCHOOLS.—Under the head of Schools in vol. xxx, page 50, we remarked the increased interest which was then taken in the subject of the education of children especially those of the poorer classes. From that time the interest has greatly increased; many plans have been proposed, some have been adopted, and even in the establishments for the education of the more wealthy classes, much improvement has taken place.

From the Reformation onward, when the Scriptures were first freely opened to all, no one believed that it was a necessary qualification for a Christian man or woman that he or she should be able to read the Scriptures. The oral instruction of the Church was thought all-sufficient in religion. To have an educated church, or an educated clergy, or an educated laity, was the object of those who most valued sound learning. The first colonists of New England founded a common school wherever they met to clear the forests and to cultivate the soil. The purpose of those schools was to teach; and it was from among the people educated by the Scriptures, who had been educated, who had been taught from the beginning of time, that the Reformation was to obtain support. When the Puritans came to this country, the idea of teaching the members of the congregation, especially of the children, to have a knowledge of the Scriptures, was the object of all persons. Neither the desire of education for the clergy, nor the desire of education for the laity, was taken for granted. Education was to be inculcated, to be urged, to be insisted on, and the education to be given was to be the education of the Scriptures. In no country in the world were the schools for the education of the people more necessary, more needed, than in this country. In no country in the world was the educational system of the nation more necessary, more needed, than in this country. The state of education of the people was the greatest need of the nation.

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There are four elements of the educational system in England, limiting the inquiry to that education which is woolly, or in part, gratuitous:—

1. Education by the Church, from the establishment of monastic institutions, till the Reformation.

2. Education by endowment, immediately subsequent to the Reformation, for the most part limited to schools for the higher branches of learning, called grammar-schools.

3. Education by the state, and especially after the Reform, when the state took the place of the Church, and the state became the educational system of the nation.

4. Education by voluntary associations, whether Sunday schools or day schools, some of which have, within a few years past, received a limited measure of assistance from the State.

The exclusive education by the Church has passed away. Education by the state never existed in England—even in the more restricted sense of state-counsel and small money. Neither the state nor the educational system of the nation ever existed in England. The educational system of the nation was the educational system of the nation. The state of education of the people was the greatest need of the nation. There was a system of education among them which they cherished and upheld. We live in another era, but it is not wise to let the people who are lost go by without realizing the necessity of the educational system of the nation.
bureaus out of the sons of the mechanics and the laborers; and many a man who had been a charity-boy in his native town, when he had risen to competence, pointed with an honest face to the institution which had made him what he was, and he drew his purse-strings to perpetuate for others the benefits which he had himself enjoyed.

According to the digests of the Reports made by the Commissioners for Inquiry into Charities presented in 1845, the annual income of the endowed schools-amongst which the mass of the schools mentioned by the Commissioners, in 1818. According to these returns the annual revenue of the endowed schools of England was 300,000£, to which if we add 7000£ for Wales, we have a very near approach to the revenue of the digest of 1842; the same returns state the number of endowed schools in England as 4107, and of children educated therein, 165,435; and in Wales, schools 209, children 7625. In 1853 a serious of questions was addressed to the overseers of the poor in England and Wales, the answers to which would show a falling-off in the number of endowed schools and children therein educated, giving the schools as 4106, and the children as 163,764. If there were such a fall ing-off, it may be accounted for by the fact that some of the endowed schools had been illegally converted into national schools. Computed from these measurements it is stated unanswerably that the revenue of the endowed schools was 300,000£, the number of schools 4000; and the number of scholars 150,000.

300,000£ thus derived from the rent of land, rent charges, funded securities, &c., during three centuries, has been the foundation upon which has been built up much of the sterling worth of the English character. One hundred and fifty thousand children have been receiving, for a long series of years, the most liberal and gratuitous education, some of the commoner rudiments of worldly knowledge, all of them religious instruction,—at an average cost of 2£. per child. The average cost of each scholar in the national schools is 11a. 2s. per annum. There have been many attempts, and some have been successful, to turn the funds of the endowed schools, contrary to the wills of their founders, into schools for universal education; and these attempts have been supported by the Court of Chancery, or encouraged by the legislature. But it has been found that the funds, upon the mortl武装 system, about 640,000 children, instead of 150,000. We apprehend that, with the best intentions, some unsound opinions have been taken up on the subject of endowed schools. The registrar-general, in his Report on National Education, says: "in many cases insufficiency of the national education is the more to be regretted, as the means of education exist, and the funds left for educational purposes, if properly applied, in the charities and public institutions, would, with some assistance from Parliament, supply the children of the poor with the sound knowledge which the scanty earnings of the parents do not enable them to purchase." We affirm that these funds are properly applied when they are applied to the precise objects for which they were intended. There have been abuses in the management of some of these institutions, which have been corrected. The Commissioners of Inquiry into Charities reported a vast amount of delinquency and neglect, especially with regard to grammar-schools. The Court of Chancery, upon the representations of the Commis sioners through the attorney-general, has remedied many of the most glaring evils; and we have now many institutions distributing a large measure of good, where formerly were only "Incompetency of the master," "School discontinued," "School non-existent," "Grammar-school abolished by trustees," "No free scholars taught,"—these are not uncommon statements amongst the original reports upon grammar-schools. But this is not the whole. Many of these abstracts and visitors at the present day would be ashamed of such gross misapplications of the means of preserving sound learning amongst the people. Legislative action has been brought to bear upon some; and the Harper Charity at Bedford, and Dalwich College, for which an Act was passed in 1857, now make their ample means much more generally advantageous. Abuses, no doubt, still exist; but, as a whole, the grammar schools have been a blessing to this country. They have been alive amongst us the liberal studies which have nourished a race of divines, lawyers, physicians, statesmen, that may challenge comparison with those of any nation. They have opened the gates of the higher employments to industry and talent; and we are assured from the Reports that they had mitigated the inequalities of society. They have ploughed up the subsoil of poverty to make the surface earthy and richer. What the grammar-schools have done for the higher and middle classes, the free schools have done for the lower, as a class. They have been a means of education for some boy who had no ambition, perhaps no talent, for the struggles of the scholar; they taught him what, amongst the wholly untaught, would give him a distinction and a preference to his worldly condition. If his children have been less fortunate, because they knew that there was no absolute bar to their children and their kindred running the same course.

Do we assert that there is nothing to be desired beyond this state of things? Unquestionably not. But we do desire that no feelings falsely called utilitarian, should induce us to wish the appropriation of funds to one purpose, that were appropriated to another purpose. An American writer, speaking of the property given to endowed schools, says: "It is easy to see that, if this sum were consolidated, and then applied to the support of liberal education, it would amount to an incomputable good." (Horace Mann’s Educational Tour, 1844.) The evil is computable, as well as the good. The good would be the education after some universal manner of 400,000 more children than are now educated out of these funds; the evil would be the education after the manner prescribed by the founders of these schools, and we think that the manner prescribed by the founders is more than ever necessary as education of some sort becomes more and more universal. We desire that the most arable land should be purchased to support a highly meritorious poor scholar by an exhibition at the university, than by leaving a thousand pounds to instruct fifty boys and girls in reading and writing. And why? The answer is the same as before: because a man is prepared for too large a share for individuals to deal with. They can more properly employ their charity in raising the character of education, by encouraging the higher branches of knowledge. The spirit of voluntary association, aided in a manner accurately calculated to its nature, may distribute millions. That spirit is not slumbering when we know—as we shall have to show in detail—that nearly 900,000 scholars are now receiving instruction more than the number that were instructed in 1855. These 900,000 scholars cost more for their annual instruction in addition to the cost of the schools which contain them—than the annual revenue of all the endowed schools that survived the Reformation, that have been founded since the Reformation, and which are continued in the service of education. This is the only systematic education which the people of England received up to the beginning of the present century.

Up to the year 1833 the legislature had limited its data with regard to education to inquiries into its state, and lamentations over its insufficiency. By the Acts of 1833 the principle was first established that it is just and wise to appropriate some portion of the public income to the purpose of education in England. Twenty thousand pounds were then voted, in aid of private subscriptions for the erection of schools, and in 17 places, of which they were the only systematic education which the people of England received up to the beginning of the present century.
opposition to this great measure, which had been adopted upon the responsibility of the executive government. The administration persevered in their plan, against a powerful minority in the House of Commons, and a vast majority in the House of Lords, who prayed Her Majesty to revoke the order. The House of Commons passed an address to the Crown, in which they expressed a regret that the Act had been appointed. The first parliamentary grant placed under the direction of the Council on Education was 30,000/, which was continued annually to 1843; it was then raised to 40,000/, for 1843 and 1844; in the session of 1844-45, it was increased to 150,000/; in 1845 and 1846, 150,000/; each year; in 1850, 110,000/; in 1851, 150,000/; in 1852, 160,000/; in 1853, 260,000/. In 1854, 263,000/; in 1855, 306,381l.; in 1856, 451,213l.; and in 1857, 641,203l.; a total since 1853 of 3,206,757l.

But there were other legislative actions, as well as plans to increase the grants of money. Without noticing the number of schemes proposed, and the debates upon them, in which the adherents of the voluntary principles, and those advocating a national superintendence and support, have contrived to neutralise each other’s efforts, we will shortly notice what has been actually done. In 1842 an Act was passed for facilitating the acquisition of sites for school-houses, which was repeated, amended, and extended in 1850, 1852, and 1853. In their attempt to remove and lessen those evils, and scientific purposes were exempted from the payment of county, borough, parochial, and other local rates; and in 1854 further facilities for the institution of such societies was afforded by another Act. In 1844, in a Poor-Law Amendment Act, the Church of England, as an established body, was combined parishes and unions into school districts, to form boards for their governance, which boards, subject to the regulations of the Commissioners, were to appoint, pay, and control its teachers and other officers, for the purpose of instruction; and the Act further provided that the minister was compelled to attend any religious service contrary to the principles of, or be instructed in any religious creed contrary to that professed by the parents; and in 1846 the provisions of the Act: were extended to provide for the support of schools not in unions, and removing the limitation of expense, previously limited to one-fifth of the aggregate of the poor-law expenditure. In 1847 the law regulating the attendance at school of children employed in print-works was amended. In 1850, an Act was passed empowering town-councils to establish public libraries and museums, by imposing a small rate, such libraries and museums to be open to the public free of expense; extended in 1858 to places not having councils and to parishes; and similar Acts were passed for Scotland and Ireland. While the Acts and Grants were continually bestowed on the subject of instruction the children of the honest poor, it was felt that there was a lower class, in which, probably to a great extent, ignorance and improvidence was the consequence; and it was resolved that some provision should be made to recall youthful vagrants or petty offenders to the paths of rectitude by judicious instruction; and after an experience of several years, both in England and Scotland, supported by voluntary contribututions, it was endeavoured to provide a benefit to those who were more numerous and were mostly neglected and rejected by the streets, and taught or trained, by the Charity, but to be recoverable from the parents, if able to pay. Other Acts, with the same object, were passed in 1856 and 1857, by the last of which justices of the peace in towns and boroughs, were empowered to order the instruction of any children received into their care, in their own houses, or in those of others, when they could not be found a place of education, and his careless or probably dissolute parents may be forced to contribute to his support.

Besides the above, which relate chiefly to those not entirely destitute, in England, an Act was passed in 1850 for amending the Ragged Schools Act, bringing under its provisions the parish poor-law schools, and by the Act, children of two years of age and over, but under sixteen, may be educated at the religious denominations of their parents, if the parents are willing to pay, or if the children are poor, be educated at the expense of the parish, and the Act also diverted a portion of the poor-law money to provide for this object. The Act also made a provision for those who, having been educated at the expense of the parish, should afterwards become destitute of any means of support, and in such case the parish would have the power of maintaining such children. In 1857 there was also passed an Act to make better Provision for the Care and Education of Ragrant, disturibute, and disorderly Children, and for the Extension of Industrial Schools. By this Act, without waiting any longer for the gazette to be printed, the Guardians of every parish, town, city, or other place of education, and his careless or probably dissolute parents may be forced to contribute to his support.

To Ireland the grants of money for the diffusion of education have also been large, and, on the whole, increasing. An Act for establishing Public Libraries and Museums in Ireland (18 & 19 Vict. c. 40) was passed in 1853; and a number of schools have been established, chiefly under the direction of the Roman Catholic clergy, to whom extent supply the place of Reformatory schools. The duty of licensing newspapers was assigned by the law in 1855, and the reduction of postage on printed papers, books, and MSS., may also be fairly considered as aids to education.

In addition to these and other legislative action, the general public have not been wanting in efforts to diffuse education. In most of the large towns Ragged Schools have been formed and supported for the instruction of the more destitute children; and, in conjunction with more school learning, it has been endeavored to provide for the public funds, for establish the shoe-blackbrigades and crossing sweepers, by which boys during the day are enabled to earn money, a part being devoted to their support, and the remainder placed to their account, to form a fund for their future advancement; their evenings being spent in school. The results, on the whole, have been very satisfactory. Schools have also been established for teaching girls Common Things, chiefly in domestic economy. The preparation of teachers has been one of the objects aimed at, and the means employed have been various, but, in the great number of schools, the young men and women, who are to be the teachers, are at present to be the guardians of the education of the children. The Reports of the Board of Education, and also by the above-named societies to visit their own; and in the Report of the British and Foreign School Society in 1857, one of them, Mr. William Chalmers Bannatyne, makes the kind of education given in most of our British schools some ten years ago, it is with ordinary gratification that I observe the vast improvement that has been effected, both in the expense and in the method of teaching it."  

The Report, in 1854, of Mr. Horace Mann on Education, compiled upon the materials furnished by the census of 1851, confirms this. He states that there were then 40 colleges, supported at an annual cost of 80,000l.; and that from five belonging to the National School Society, 527 qualified teachers issue annually. By the whole about 400 masters and 320 mistresses are annually prepared for their duties.

Looking then, to the prodigious exertions that have been made since 1833, we may conclude that from official returns we should find such an increase of school accommodation, and of children under instruction, as would leave little to be done beyond a steady perseverance in the same course of affairs. In 1843, the government’s policy was considered with reference only to the numerical amount of education; the quality of the education given embraces a much wider range of inquiry. Important as it is to ascer tain with exactness the number of children daily receiving instruction by the aid of voluntary societies, it is not possible to know the means of such computation are not yet perfect; and the computations of those who take different views as to the necessity of State interference are so widely different, that it requires a very careful analysis, and, what is more, a complete abnegation of the spirit of partisanship, to enable us to arrive at safe conclusions.

The Rev. Mr. Hook, in a pamphlet published in 1846, calculated that for the proper instruction of the people, one in every 20,000 is required to be educated at school. Some enthusiasts say the proportion should be one in five. E. Baines in 1845 estimated that one in every nine was then at school. Mr. Mann, in his Report, thinks that one in eight would be sufficient for all useful purposes. In 1833, in a population of 14,100,000, the number of day scholars was 1,276,047, which gives one in every 11.27; and of Sunday schools, of 1,645,800, or one in 9.28; the total is 2,920,337, or one in every 5.02. But to include the Sunday schools would be a fallacy; for the instruction, though extensively given, only includes reading, and has led to much reading as to enable children to read their Bible and a few other religious books, and many of the children are also attendants at day schools. By the census of 1841 the number of children between five and fifteen years of age, in a period during which the greatest numbers were making the conclusion of their school education, was, in round numbers,
The term 'scholar' may have been loosely understood, but the probability is that all were being taught something. Of the number in the census return 303,348 were boys and 183,169 were girls, attending at 5942 schools. At public day schools there were 280,046 scholars, and at private day schools 113,302 scholars, of which, however, the census includes all persons at school, and that of the 286,611 of whose teaching accounts were obtained, 17,766 were from fifteen to twenty and upwards. This would reduce the comparative number with England to 268,845, one in every 4.8. Sunday school returns are not so much frequented as in England. At the time of the census there were 295,545 scholars, or little more than one in ten of the population. At adult evening schools there were 324,987, of which 243,369 were boys and 81,618 were girls.

Of the total number of boys in the public day schools, out of 115,028 of whom information was given, 134,327 were being taught reading, 53,005 writing, 68,174 arithmetic, 42,322 English grammar, 48,508 geography, 6770 modern languages, 9111 ancient languages, 6400 mathematics, 4197 drawing, 31,857 music, and 1092 industrial occupations. Of 115,028 girls in public day schools, 98,612 were being taught reading, 51,880 writing, 43,483 arithmetic, 24,435 English grammar, 28,279 geography, 3990 modern languages, 3060 ancient languages, 5590 mathematics, 3093 drawing, 25,139 music, and 2013 industrial occupations. The proportions are nearly the same in the private day schools. We may remark, however, that in the parochial schools music only means the singing of psalms, and of English songs; in Scotland, only the number of schools in which such subjects are professed to be taught. In Scotland the average yearly salary of the parochial master is 25s., with, in general, a residence; of the mistresses the salary is 16s., with a residence and income. Of course, the object in the last-named religious establishment is the instruction of parochial schoolmasters, but the improvement was not, as is shown by the census returns.

In Ireland the endeavours to promote education have been constant, but till lately very ill-applied. Under Henry VIII. an Act was passed that every family should send one child to an English tongue to all in his cure. By the 12 Eliz. cap. 1 (1570), a free school was to be established in every diocese. The statute of Henry VIII. was re-enacted under William III. of Scotland. There were more children taught in the year 1760 than in 1725, and it is supposed that Protestantism should be taught; of course the schools were ineffective; and almost of course they became a mere form, the clergyman giving forty shillings a year to some one called a schoolmaster, and taking no further trouble. In 1731 the Incorporated Society for Promoting English Protestant Schools in Ireland was established, and was liberally assisted from the public funds. In 1741 they had formed 5 schools, at which they had educated 372 children (who were digital and lately were increased to 1388). In 1767 the annual income was 9070, or 10,000. These were the Charter Schools. In 1768, after an expenditure of 499,000, the celebrated John Howard proved that the children were ill-treated, their education neglected, and that they were made to work for their masters, and were thus deprived of the years of life that should have been devoted to the purpose of conversion. The Irish House of Commons admitted the facts, but continued to vote money. In 1808 orphans and children of Protestants were admitted as well as Roman Catholics, but with the same separation from the families as before. The number of scholars increased, they were still under 1000, and the annual cost was 35,000, of which sum three-fourths were paid by the State. After a report on their condition in 1825, the government support was suspended, but the schools were opened; though utterly failed, the Irish poor were far from being an uneducated people. There were 'Hedge' schools, where the children of the peasantry were taught by the priest so effectually that Weikfield in his 'Forty Years in Ireland' calls the Irish 'universally educated' people. In 1817 the Kilclare Parochial Society began their operations. They were to form two model-schools in Kilkare Place; they were to assist with grants the founding of schools; to receive and qualify masters; to teach and assist in making proper books; to cause the schools to be inspected annually; and to encourage deserving masters and mistresses by gratuities. These schools were at first a success. They were supported by government grants, and were tended by ancients. In 1825 they had 1490 schools, and upwards of 100,000 scholars, but their length became distasteful to the Roman Catholics. In 1831, therefore, after a Parliamentary inquiry, a Board of

3,620,000, leaving nearly 800,000 unprovided for. But among the industrious and working classes comparatively few can afford to keep their children at school till they are fifteen, and the far greater portion will only be at school for periods of four or five years, or even less. It is not easy to test the amount of the public aid that is required. In 1372-3, 30,886 men and 25,037 women were married. In 1383-4, out of 121,028 marriages, 40,557 men and 58,959 women signed the register with marks, so that only 59.5 per cent of the males could write, and only 41.1 of the women. In 1531 the total number of children between five and fifteen, was 4,005,718. But, probably from the extension of infant schools, it was found by the census that a large number of children were sent to school at the ages of three and four, and therefore the number between three and fifteen in 1531, was 105,711 children. Of whom 56,461 were boys and 49,242 girls. Of this number, beginning at five years old, 381,774 boys and 218,055 girls were employed. Between five and ten, upwards of 2000 boys are messengers; nearly 2000 are farm labourers; upwards of 5000 boys and 7000 girls are engaged in the cotton and woollen manufactories and in straw-plaiting; and 1209 boys and 11 girls in coal-mining. Between ten and fifteen the numbers employed in nearly every profession become very large, showing that this age is the most useful; but for the greater part of the period of education, the ordinary term seldom extends beyond twelve or thirteen. The demand for juvenile labour, and the prospect in a labourer's family of gaining an additional income, is an inducement which will probably be sufficient to overcome the prospective advantage of sending the children to a school, where the instruction gives little promise of promoting the child's pecuniary interest. To the number thus withdrawn from school, must be added a considerable number of those who, from the exigency of the five years and ten, is separated from the parents by themselves: the returns give 17,308 boys and 27,323 females, which there is little doubt represent those having teachers. Deducting these classes, we have 4,264,243 children who ought to be provided with the means of education. Though illiterate, every year every great attention, yet it is not likely to be continuous through the period, we make no deduction on that account. To supply the want, the census return shows an attendance of scholars in day schools in 1836, a proportion of one in eight of the population, but little more than half of the number of children. The Sunday schools make an addition of 3,407,649, which carries the number above what is required; many, however, of the younger day-schoolers attend them, and some of the employed may attend, but, as we have said, the education afforded at these schools is inefficient for practical purposes.

The Report gives a table showing the number of scholars for each county, between three and fifteen, by which it would appear that the average attendance of scholars between their third and fifteenth year is five years, and between five and fourteen, four and two-fifths. What a child can learn from three years old to eight cannot be much, supposing they are all at school, and certainly not during the five years and ten, which is the age at which they leave school, and is almost certainly lost when subsequently employed in labour, without the aid of secondary schools to keep their scholastic acquisitions in use. This is shown by the marriage registers for 1836, in which, out of 604,526 persons married, 44,806 men and 62,672 women signed with marks, or 34 per cent of the whole. This is certainly a great advance on 1833, but as in the last eighteen years such great efforts have been made, a more satisfactory result might have been expected. If the whole of the greater part of this number of people must have received their education before the most material improvements had been introduced. Great part of what we have written applies equally to Scotland and Ireland. Scotland shares in the Parliamentary grants we have enumerated, and has also adopted most of the extensions of school education we have mentioned. On the whole, in that country education is more widely diffused than in England, and in the parochial schools it is of a much better class. Of the five years and ten, the greater part of the money received from the Government, and from the private endowments, is expended in providing instruction; and mathematics and Latin, with occasionally Greek, is taught where the scholars are capable and desirous of receiving such instruction. In 1831, the population of Scotland was 2,385,674, and by the return, the number of scholars was 368,517, or one scholar to every 7.84 inhabitants, but under the heading of `Occupations,' the number returned as `scholars' was 426,568, or one in every 5.87. In the latter number

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National Education in Ireland was established, composed of eminent men from all the religious beliefs in Ireland, who were commissioned to draw up a scheme of instruction, and provided that the children of all creeds should attend. This was done very successfully. The government were liberal in their grants; and at the close of 1833 they had established 789 schools which were attended by 107,116 scholars. These schools continued to thrive, and the number of scholars increased to 1852, where there were 120,000 annually; in 1851, 134,566; in 1852, 164,577; in 1853, 189,073; in 1854, 163,400; in 1855, 213,260; in 1856, 297,041; and in 1857, 328,849. The number of scholars attending the schools, in consequence of the large emigration of the few preceding years. The census returns of 1851, however, tell a very unsatisfactory tale. The total population of Ireland was 6,618,761; the number of males who could neither read nor write was 1,102,650; of the females, 1,953,633.

But in that year the number of the National Society schools had increased to 4704, there were 94 in progress of erection, and 13 had been completed. The number of children on the rolls was 260,451; there had been 257 teachers trained in the school during the year, and 33 at their own expense. Of the 290, there were 21 of the Established Church, 39 Presbyterians, 2 other Protestant Dissenters, and 290 Roman Catholics. The new schools, besides being free religious schools, with 303 pupils, of whom most must pay either fully or in part. On Dec. 31, 1855, the number of schools was 5193, and the number of children on the rolls was 638,446, a decrease from 1854 (up to which year the number had been continually increasing), an unfortunate feeling of dislike taken to the schools by the Roman Catholic priesthood, and partly from the large emigration that had taken place from the kingdom. In 1856 the annual report of the Church Education Society claimed 90,572 scholars, but these include "schools in connection," and in 1851, under the same heading, they numbered 105,878 scholars. The Sunday schools in 1855 mustered 213,019 scholars.

The 2nd Act was passed for endowing Maynooth College for the better education of the Roman Catholic priesthood. In the same year was also passed an Act "enabling her Majesty to endow new Colleges," in consequence of which the Queen's Colleges of Belfast, Cork, and Galway have been established. A sum of 10,000/. was assigned out of the Consolidated Fund for purchasing the sites, and erecting and furnishing the buildings of the three Colleges. Her Majesty and her successors were made proprietors of the same; and the funds for the same purposes were vested in the Crown for the purpose of executing the office. The appointment of the presidents, vice-presidents, and professors, was entrusted to the Crown, until parliament should otherwise determine. The Commissioners of the Treasury were empowered to issue annually a sum of 150,000/., as a foundation stock, for the erection of buildings, for the payment of salaries, and for the other expenses in each college; it being moreover provided that reasonable fees should be exigible from the students. Lecture-rooms were directed to be assigned for religious instruction; and it was enacted that no student should be allowed to attend any of the colleges unless he should reside with his parent or guardian, or some near relation, or with a tutor or master of a boarding-house licensed by the president, or in a hall founded and endowed for the reception of students.

A president and vice-president for each college were soon after nominated, and the erection of the buildings was begun. The other appointments were made in August 1849, and the three colleges were opened in the end of October following. The annual sum of 12,000/. had shortly before been granted by Parliament for providing them with libraries, philosophical instruments, and some other requisites.

Originally it was intended that the number of professors in each college, exclusive of the president and vice-president, should not exceed twelve, and letters patent constituting them upon that basis were passed for each under the great seal of Ireland in December 1845. Afterwards it was determined that the number should be augmented for the present to thirty. The annual sum of 12,000/. had been granted by Parliament for the salaries of these professors. The vice-president however is also a professor. New letters patent embodying that extended scheme were granted in favour of each of the three colleges in November 1849.

A rising constitution, then, the body politic and corporate of each college consists of a president, with a

salary of 800/. and a house; a vice-president, with a salary of 500/. and a house; and professors of Greek, Latin, mathematics, history, and English literature, logic and metaphysics, chemistry, mathematics, astronomy, physics (with a salary of 250/.), modern languages, natural history, mineralogy and geology (each with a salary of 200/.), English law, jurisprudence, and political economy, civil engineering, and agriculture (each with a salary of 150.), the Celtic languages, the practice of divinity, and the law of entail and mortmain (each with a salary of 100.). There are also attached to each college a registrar (with a salary of 200/), and a bursar and librarian (each with a salary of 150.). A sum of 300/. is also granted for the payment of clerks of post and servants. The total annual expenditure for salaries is thus (deducting 200/ for the professorship held by the vice-president) 5500/.

The remaining 1300/ of the annual charge on the consolidated fund for the number of males who could neither read nor write was 1,102,650; of the females, 1,953,633.

The scholarships awarded at the commencement of the session at Belfast are: of 48 each to students of the faculty of arts; of 40 each to students of the faculty of medicine; of 20 each to students of the faculty of law; 20 each to students of civil engineering; and of 15 each to students of agriculture; the number being equally divided in all cases between students of the first and students of the second year. The scholarships awarded at the commencement of the year at Cork are:

The session in all the colleges extends from the third Tuesday in October to the second Saturday in June, and is divided into three terms by recesses of a fortnight at Christmas and at Easter. The fees for each class vary from 11 to 2110/; and an additional fee is charged to each regular and settled student to the bursar on behalf of the college of 3l. at the commencement of the first year, and 2l. at the commencement of every subsequent year.

It had been all along contemplated that matriculation and attendance at these colleges, as at similar institutions established by public authority in our own and other countries, should conduct to graduation both in arts and in every other faculty, except only that of divinity; and all the regulations and arrangements of the several institutions have been moulded upon that understanding. It was a question however we believe, for a considerable time whether, with a view to the conferring of degrees and other purposes, each college should be erected into a distinct university, or the three constituted into one university. The latter plan has been adopted, undoubtedly to the placing of the new establishments in a greatly superior position to what they would have held if they had been left each to itself. It was agreed that a mere Belfast, or Galway degree would have carried the same weight with one from the Queen's University in Ireland. In the letters patent creating such a university, her Majesty has declared that the graduates of our said University shall be full members of all the learned societies, and that all the immunities as belong to persons holding similar degrees granted them by other universities, and shall be entitled to whatever rank and precedence is derived from similar degrees granted by other universities.

The peculiarity of and the need for such colleges arose from the state of religious feeling in Ireland. The greatest proportion of the people are Roman Catholics, and there is a large number of Presbyterians: but in Trinity College, Dublin, there are no arrangements which either recognize the existence of any form of religious belief but that of the Established Church; not only is the student who may hold any other creed (in so far as such dissenting students are admitted, at all) left without any spiritual superintendence whatsoever, but the entire system of teaching and discipline is in the hands of members of the Church established by law, and is regulated and administered in all respects in conformity with the doctrines and ritual of that Church. Freedom of admission to Oxford and Cambridge has long been one of the demands which Protestant Dissenters have urged most clamorously. Notwithstanding considerable opposition the experiment has succeeded. The colleges are filling with all the religious creeds; but while thus free to all, the morals and the peculiar faith of the student is sedulously attended to.

Neither in England have the efforts to promote education been confined to the poor. At Durham the bishop and dean and chapter obtained an Act of Parliament in 1639, authorizing the institution and endowment of a university,
which was opened for students in October 1833. In 1837 a royal commission was obtained by which the style and title of the Warden, Masters, and Scholars of the University of Durham was given to the institution. The charter gave the power of conferring degrees, and confirmed the rights and privileges annexed to it by Act of Parliament, naturally enjoyed by charter. The bishop is appointed visitor; the dean of Durham is constituted warden. To the professorships of divinity and ecclesiastical history and of Greek and classical literature, which are both in the patronage of the bishop, canons in the cathedral are appointed. In the same manner of mathematics, the reader in law, Hebrew, history and polite literature, and natural philosophy, the lecturer in chemistry and mineralogy, and other offices of the university, are appointed by the dean and chapter. Of University College, the Rector of the dean of the University of Durham; Bishop Hatfield's Hall, instituted in 1846, is for divinity students. It has four tutors, one of whom is principal, a censor, and a chaplain. The academical year consists of three terms of not less than eight weeks each, which are called Michaelmas, Epiphany, and Easter Terms. The age of admission to the academical course is from 16 to 21; and for the divinity course, between 21 and 26; beyond this age students must be admitted by special leave. Care has been taken that the necessary expenses of students should be moderate as compared with the income of their parents, and any approach to extravagance is sedulously guarded against.

In 1834 an Act of Parliament extended the right enjoyed by the graduates of Oxford and Cambridge to practise physic without a licence, and also to the graduates of the University of London. In the same year by another Act, a commission was appointed to draw up regulations for the improvement of Oxford University, and in 1837 a similar one was passed for Cambridge. Under these regulations valuable improvements have been effected, and more may be confidently expected. Among those effected are the breaking up of the close scholarships (especially those of Winchester school) and throwing them open to general competition, the establishment of a numerous number of prizes, the creation of a number of new censors, and the abolition of the oath on matriculation and on taking the degree of B.A.; by which last regulation Dissenters are admitted to the whole advantages of a university education. In Scotland also an agitation is being made for some improvement in the universities.

SCHOLAR. [Toursman.]

Schumacher, Heinrich Christian, was born on Nov. 16, 1780, at Bramstall in Belgium. He distinguished himself by his mathematical proficiency and by his predilection for astronomy. At the age of thirty he was created professor-extraordinary of astronomy in the university of Copenhagen, whence he was called in 1813 to be director of the observatory, a post which he held until 1815 as professor of astronomy and director of the observatory there. In 1817 he was employed by the Danish government to measure the degree of longitude from Copenhagen to the west coast of Jutland, and the distance of latitude from Skagen, the northern cape of Jutland, to Lauenburg, on the frontiers of Hanover; afterwards continued through Hanover by Gauss. In 1821 he received from the Royal Scientific Society of Copenhagen the direction of the survey and mapping of Holstein and Lauenburg; and in that year the king caused a small but excellently furnished observatory to be built for him at Altona, where he resided till his death. In 1824, in conjunction with the English Board of Longitude, he fixed the measure of difference between the observatories of Greenwich and Altona, for which purpose the English admirably furnished a steam- vessel, provided with twenty-eight English and eight Danish chronometers. In 1830 he was employed in ascertaining the length of the seconds' pendulum at Copenhagen, and made the base of the Danish scale of measures. In 1813 he commenced a work, 'Astronomische Nachrichten,' a work that is still continued, and is the only one that serves as a vehicle for the communication of opinions and facts from the astronomers of all the world. In 1826 he published a second volume of this. From 1829 to 1829 he published his 'Astronomische Hütten,

a'certainly of a carefully calculated ephemera. In 1830 in conjunction with Bessel he undertook the editing of another Astronomische Jahrbücher. He was a diligent and correct observer; in 1836 he announced the exact distances of Venus, Jupiter, Mars, and Saturn from the earth; and the phenomenon connected with Encke's planet Atra was noticed in this by the older part of his life. He died at Altona on December 29, 1850. Schumacher united great talents with much modesty. He enjoyed the confidence of his sovereign, which he repaid by his diligent services, and he uniformly treated his fellow-labourers with the greatest kindness and impartiality with unostentatious liberality.

Schumann, Robert, a composer who has a great reputation in Germany, but whose works are little known in this country. He was born about the year 1814, and spent about ten years in the study and practice of his art. His excessive application disordered his mind; and when he died, July 29, 1856, he had been several years the inmate of a lunatic asylum. He was for a time a private groomsman of the prince who, on the day, who, with several children, survives him. Schumann was undoubtedly a man of great genius; but he has injured his reputation with his contemerals by his endeavours to found a musical school, or sect, professing to disregard the authority of the older masters, and to establish a new system of musical composition. As music has always been in a progressive state, posterity may perhaps do him justice by adopting his innovations of style. His only work of magnitude which has been publicly performed in England is a cantata, 'Wilhelm Meisters Tod,' the composition of a part of Moore's poem. It was produced at one of the Philharmonic Society's concerts in 1836; when the principal part was sung by Madame Goldschmidt (Jenny Lind); and, though our critics were at variance respecting its merits, it was generally regarded as a work of no ordinary powers and beauty.

Schwanthaler, Ludwig Michael, one of the most eminent of modern German sculptors, was born at Munich in 1802. For some generations his ancestors had been sculptors in the Tyrol; his father, Franz Schwanthaler, was settled in Munich, where he acquired a very respectable standing as a monumental sculptor. Ludwig received a good classical and general education; he was desirous of being initiated into the arts of drawing and modelling, and the use of the chisel, in his father's studio. At the Munich Academy of the Fine Arts he was regarded with coldness; if not unlike on account of his free notions in art, by Von Langer the director, who is said to have urged his friends to dissuade him from going to some other profession. The death of his father in 1831, by rendering it necessary that he should conduct the business for the maintenance of the family, fixed his destiny as a sculptor. A commission was given him from the King; the prospect of making himself known was one from the King Maximilian Joseph in 1824, to design a centre ornament for the table. It was to be of very large size, and the figures in relief, each about six inches in height, were to represent the nine divinities of the Roman Temple of Jupiter. So much as was executed in described as being very beautiful, but the death of Maximilian (October 1825) prevented its completion.

Schwanthaler now proceeded to Rome, where he remained a year, deriving great benefit from the advice and friendship of Thorwaldsen. He carried back with him to Munich two elegant bassi-relievi of the 'Birth of Venus,' and 'Cupid and Psyche,' and through the influence of Cornelius he was employed to execute two vast freize ofy great basi-relievi of the Glyptothek, then in course of completion. Among other works which about this time he produced we must mention a statue of Shakspeare for the theatre, and a grand bas-relievi of the Iliad, consisting in all to a length of 150 feet, of the Apotheosis of Burgundy for the dining-room of the palace of Jupiter. In 1838 he again went by desire of King Ludwig to Rome, to complete Rauch's design for the south pediment of the Walhalls as well as to execute various other royal commissions for the new palace.

The story of Schwanthaler's life was one of incessant activity. The admitted head of the sculptors of Munich, the professor of sculpture (from 1835) in the Academy there, and the favourite of the art-loving King; he employed himself in the execution of innumerable important commissions of all kinds. From 1835 to 1840 he was engaged in the planning and working-out of the sculpture of the Romantic school, a vast architectural undertaking. Schwanthaler produced in rapid succession an astonishing number of works of annual magnitude and grandeur, and was the centre of a crowd of able and devoted scholars and assistants. For the few remaining years of his life, all spent in ill health, he limited himself to the management of the work and the personal superintendence of the artists. The magnum opus of Schwanthaler was the workshop of the Academy, which was completed in 1864. He died at Munich on December 11, 1863, about a year before its completion. Schwanthaler was a man of remarkable versatility and ability. He had a vast store of knowledge; he was at once a good draughtsman, a skilful sculptor, and a fine draughtsman. He had a remarkable power of executing the most intricate work with the greatest ease and facility; he was a master of a pleasing and studied style. He had a fine sense of beauty, but was prevented from making the best use of it by his excessive and constant application, which disordered his mind and finally brought it to an end. His statue of Goethe is one of the most remarkable of modern art: it is considerable for its grandeur and simplicity, and is a model of what a great master might have done if he had not been so constantly engaged in the execution of large and complicated works.
executed a succession of great works, such as would seem more than enough to have tasked the energy and industry of the most indefatigable and laborious workman whose days had been extended to the longest span, and who had been blessed with the most robust health.

We can name but some of his more prominent works. The southern pediment of the Walhalla at Ratisbon, filled with the intention to typify the liberation of Germany from the French yoke, is a very striking example of the northern pediment, a later work, was wholly by himself, and was of a much higher order of merit. It is called the ‘Hermann-Schacht,’ or ‘Battle of Arminias,’ and is one of the most characteristic and noble productions from the chisel. It has never been rivalled by the sculptor’s chisel. He also executed some of the statues in the Walhalla, and the fourteen carvings representing the Walkyren of the Teutonic mythology.

For Ludwig’s New Palace (Nene Königsland), Schwant- thaler not only adorned several floors but also, and he made the cartoons for numerous pictures which were painted in encaustic by Hiltensperger, Streidel, and others. Among these are a series of twenty-four compositions by Zschokhn, twenty-one from Sophocles, twenty-seven from Aristophanes, a series from the tales of the Argonauts, another from the ‘Works and Days’ and the ‘Shield of Heracles’ of Hesiod. His most famous piece of sculpture here is however the ‘Myth of Aphrodite,’ but the story of Venus was never more colorfully enacted. A fantastic story of Feist-Saalan he designed and the eight figures represent various heroes and virtues of Bavaria, on the entablature; the frieze in relief of the ‘Crusade of Barbarossa’ (‘Der Kreuzzug des Kaisers Friedrich Barbarossa’), placed above the paintings by Schnorr [Senners, etc.]; others. Of the many statues that come to mind, the host of Greek Dancers in the Ball-Room; and the twelve colossal gilt bronze statues of the princes of the House of Wittelsbach, in the Throne-Room, etc. For the façade of the Franekoth he executed statues of twenty-five of the greatest painters. For the entrance of the New Art-Exhibition Gallery (Neue Kunststellungs-Gebäude) he executed a representation of the Arts placing themselves under the protection of Bavaria. For the magnificent Ludwig Kirche he executed statues of Christ and the four Evangelists, which are placed above the entrance; and, for the ends of the gable two colossal statues of St. Peter and St. Paul. There are also by him in Munich statues, some of them colossal size, and most of them in bronze, of Count Tilly, Field-Marshal Prince Wrede, Kreitmayer, the author of the Bavarian code, and one or two others. But the chief work with which he adorned his native city was his immense statue of Bavaria, which occupies the centre of the Bavarian Hall of Fame (Bairische Ruhmeshalle). Bavaria is repre- sented as the personification of his land, her back is stretched out, and holds a laurel crown, the reward of merit; the other presses a sword against her bosom, to defend her independence; by her side rears a lion. The group, which is of bronze, exceeds in magnitude any other work in Munich, and even in Germany; the tail of the lion is near 30 feet; the pedestal is 28 feet high; a staircase inside leads up to the head of Bavaria, which is large enough to contain several persons. This vast work was commenced in 1844, but neither the sculptor nor the founder of this unparalleled work [Stölzel, Johann Baptist, S. 1], lived to see it placed on its pedestal. It was inaugurated with great ceremony, October 9, 1860. Remark- able as this work is for its size, it is equally so for its unrivalled beauty. It was the first instance of its kind, and as long as it endures it will be the most impressive monument to his genius. The Ruhmeshalle however con- tains other proofs of his versatile imagination. In the ympas on the end of the wings of the building are four colossal representations of the four capitals and peripheries of the kingdom; Bavaria, the Palatinate, Swabia, and Franconia; and the frieze contains 92 metopes, all of them designed by him; 44 containing figures of Victory, 28 the remaining 45 the arts and occupations of civilised life.

Among important public works which he designed for other places may be mentioned, his grand fountain in the Vomarkt, Vienna, around the basin of which he placed a representation of the allegories in the fountains at Munich; and principal rivers of the archduchy of Austria, pouring their waters into the Danube, which is represented by a colossal gry in the centre; another and finer fountain in the Ringen, Vienna, in which are five beautifully designed bronze figures of Austria with her four great rivers, the Danube, Vistula, Elbe, and Po; the monument of Carl Friedrich, grand-duke of Baden, with its four allegorical statues, at Carlthe, monument of Gustav Adolf on the lower Bornen, at Bremen, a colossal statue of a merchant, from the Teutonic mythology; statues and statuettes of knights and old Teutonic heroes; and a vast number of sepulchral and portrait statues, busts, and medallions, which are to be found not merely in the princely galleries and churches of Bavaria and Austria, but scattered throughout Germany, and occasionally in England.

Ludwig Schwanthaler died—his feeble frame, it is said, literally worn out by his incessant labour—on the 17th of November, 1845, having only a few months before completed his forty-sixth year. The above very incomplete enum- ration of his works will more than suffice to show the won- derful energy and industry of the man; but it is necessary to examine the works themselves to form a just estimate of his genius; for there are various instances in which he has been less successful. It is not of course be supposed however that he accomplished the impossible task of carving all these works with his own chisel. From the establishment of his studio at Munich he had about him a large body of pupils, some of whom have been or are to be mentioned here under various heads. Scarcely a portrait or relief that has been executed in the Teutonic landed states has not been designed by him, or is in any other way connected with him.

By his will Schwanthaler bequeathed to the Munich Aca- demy of the Fine Arts his studio, with models of all the principal works executed by him. The studio stands oppo- site to the house in which he died, in the street named in his honour as Schwanthaler Street. Many of his pupils have preserved the extensive collection of his works. It is open daily to the public, and is one of the great art-sights of the German metropolis of art. The Crystal Palace at Sydenham contains casts of the head of the colossal Bavaria, the ‘Shield of Hercules,’ and several other of Schwanthaler’s productions.

SCIENCE AND ART, DEPARTMENT OF. This department of the Committee of Privy Council on Education owes its origin to the suggestions contained in the Second Report of the Commissioners for the Exhibition of 1851. After rong the necessity of the industrial classes of this country receiving more systematic instruction in science and art in order to enable them to maintain their pre-emience among manufacturing nations, the government pressed on the government the advantages which would result from bringing the various institutions connected with science and art that were supported by the public funds, into close connection with each other, instead of their re- maining under different departments of the government. The government took a favourable view of the suggestion; and as a part of the "comprehensive scheme for the advancement of the fine arts and of practical science," announced from the throne in 1852, the Home Secretary was empowered to negotiate with the different holders of the public funds, the Lords of the Treasury, in March 1853, gave their formal concurrence to the proposed arrangement of the Privy Council to "unite in one department, under the Board of Trade, with the Departments of Practical Art and Science, the kindred and the Geological, and the Art and Science, the Museum of Practical Geology, the Geological Survey, the Museum of Irish Industry, and the Royal Dublin Society, all of which are in part supported by Parliamentary grants;" and, the Treasury minute proceeds, "my Lords have
given directions that the estimates for all these institutions shall be brought together under the general head of Board of Trade Department of Science and Art." The immediate purpose of this amalgamation, it was declared, was to bring the whole of these institutions under one common superintendence, to establish a central metropolitan school of practical science as well as of art, and to encourage and extend the formation of minor local institutions which should be in connection with the institutions by the central institutions, to be not only self-supporting and under the management of the local authorities.

As was above said, the institutions thus brought together under one department, were all in part supported by Parliament. It was voted for the previous year, in connection with the amalgamation were: Government School of Mines and Science, 800L.; Museum of Practical Geology, 5572L.; Geological Survey, 5500L.; Museum of Irish Industry, 3348L.; Royal Dublin Society, 6540L.; Department of Practical Art, including the Provincial Schools of Design, 17,920L.; in all 39,181L.; but the sum actually granted was 41,582L., additions having been sanctioned of 150L. to the School of Mines, and 5256L. to the Department of Practical Art.

Of these institutions the character may be briefly indicated. The Government School of Mines and of Science applied to the Arts was founded in 1831, in consequence of memorials addressed to government by the mining districts of the United Kingdom, in which it was shown that the schools for the training of mining experts which had been established in various Continental governments had much increased the economy, efficiency, and safety of mining operations in the countries in which they had been established, and that the want existed here of such establishments as would include the mining districts of this kingdom. The Government School of Mines was accordingly opened in connection with the Museum of Practical Geology in 1851. It is now merged in the Metropolitan School of Science applied to Mining and the Arts, which forms one of the two main branches of the department which is the subject of this article.

The origin and purpose of the Museum of Practical Geology were stated under the head Museum of Economic Geology, S. 1 (vol. p. 460), and it will be enough to add here, that it was in 1850 that a Museum of Practical Geology was opened in Jermyn Street, St. James's—now the head quarters of the Metropolitan School of Science. Ever since the establishment of the Museum, the Geological Survey of the United Kingdom has been carried on in connection with it, and thus extensive collections have been formed, and are continually augmenting, illustrative of the structure of the British Islands, and of the applications of geology to the useful purpose of life. The geological survey has been proceeding since the establishment of the University of London, being of course divided between England and Ireland which has advanced far towards completion. In Scotland it has, however, made but little progress owing to the maps of the Ordnance Survey of Scotland having been only partly issued.

Of these metropolitan scientific institutions we may add the Royal College of Chemistry, founded in 1845, it having been, in 1853, transferred to the Department of Science and Art.

The Department of Practical Art was a development, or rather reconstitution of the central Schools of Design of which a full account is given under Design, Schools of, vol. 1 (p. 473). The Department of Practical Art was created by an Act in 1852, which amalgamated with the other institutions in the Department of Science and Art, and before it had come into full operation as a separate institution.

The Royal Dublin Society for the Improvement of Husbandry, Manufactures, and other useful Arts and Sciences, was founded in 1731, and incorporated by royal charter in 1749. It possesses a valuable museum of natural history, an agricultural museum; an excellent library; a museum of sculpture, casts, &c. From its establishment, we believe, it has been in full sympathy with the art and science which were in advance of its time; and before it had come into full operation as a separate institution. The Royal Dublin Society for the Improvement of Husbandry, Manufactures, and other useful Arts and Sciences, was founded in 1731, and incorporated by royal charter in 1749. It possesses a valuable museum of natural history, an agricultural museum; an excellent library; a museum of sculpture, casts, &c. From its establishment, we believe, it has been in full sympathy with the art and science which were in advance of its time; and before it had come into full operation as a separate institution. The Royal Dublin Society for the Improvement of Husbandry, Manufactures, and other useful Arts and Sciences, was founded in 1731, and incorporated by royal charter in 1749. It possesses a valuable museum of natural history, an agricultural museum; an excellent library; a museum of sculpture, casts, &c. From its establishment, we believe, it has been in full sympathy with the art and science which were in advance of its time; and before it had come into full operation as a separate institution.
on admission. Several exhibitions have been founded, to be competed for by matriculated students. The lectures are open to occasional or non-matriculated students, on payment of a higher fee; and special short courses of evening lectures, at an extremely low fee, are given every session to working men only, and are attended always by as large a number (500) of diligent students of that class as the theatre will hold.

The Metropolitan School of Science enjoys rare advantages from the ready access which the students have to the treasures accumulated in the Museum at Jermyn Street. These, as was said above, consist of the extensive and admirably arranged geological collection formed during the progress of the Geological Survey of the United Kingdom, "illuminative of the structure of the British islands, and of the applications of geology to the useful purposes of life," under the able directors and indefatigable staff of the Survey. To these has been added a considerable number of mining tools, and working models of mining machinery; and of tools, and models, and specimens of machinery for general purposes. The Museum is open gratis to the public during five days of the week.

The maps and sections of the Geological Survey, and a large collection of plans and sections of mines, &c., belonging to the Mining Record Office, are deposited in the building at Jermyn Street. The chemical laboratories are those of the Royal Institution. They are open to the examination of all the members of the School. There is also a collection of stained-glass windows purchased by the School, which will be exhibited when they are bound. The collections were of the property of the Government. In connection with the Metropolitan School of Science, Cottonier to qualify students for examination in the Degree of Bachelor of Science since 1858 in several of the large manufacturing, mining, and chemical industries. These schools—which there are, we believe, nine in operation—in accordance with the principle laid down by the government on the formation of the Department of Science and Art, are in a great measure self-supporting, the Department exercising a certain amount of control, and, in return, affording a limited pecuniary aid to certified masters of the schools. According to Dr. Playfair, the Chief Inspector of Science Schools, and Scientific Referee of the Department, the schoolmasters are "an essential element of the working of the educational system, and the disposition of the working classes to support them; but even those most numerous and increasing in numbers, running the risk of abandonment at any time, become, with one or two exceptions, the expenses are greater than the receipts." Dr. Playfair is, in short, of opinion, from his experience as inspector of these schools, that the "system of self-support is not adapted to secondary schools of science, having only a constituency of working classes to support them."

Dr. Playfair has this to say of the connection with the Department, which appears to have been on the whole more successful. These are called Trade and Navigation Schools, and are intended to afford instruction to officers of the mercantile marine on the subjects of their examination at the Board of Trade. In the case of London, the Art School, located at Eastcheap, as a new experiment for the guidance of youth about to enter on a seafaring life. Besides these three in London, Trade and Navigation Schools have been opened in nine of the principal ports, and could be readily established in other shipping towns if the Department could train masters fast enough to meet the demand. One of these schools had "its present locality," when Dr. Playfair wrote, "somewhere in the ocean between England and India;" Mr. Green, of Poplar, having fitted out "one of his finest ships as a School of Navigation, carrying a number of the midshipmen under one of our [the Department] masters, who is bound also to instruct the common sailors in the principles of navigation." An example which might be well followed in this respect.

The Art Schools are of older date than the Schools of Science, and, appealing to a wider circle, have almost necessarily made greater numerical progress. The Art branch of the Department has, as we have already said, its head-quarters at South Kensington, on the estate purchased by the Commissioners of the Exhibition of 1851 [Exhibition of 1851. S. 2], and is a development or reorganisation of the old Schools of Design, whose history and constitution are given elsewhere. [Schoos or Dasso, S. 1]. As at present organised, Art Schools of Art consist of the Art sections of the Department, are, in the words of the official programme—"1. To train male and female teachers to give instruction in Art, to certify them when qualified, and to make them annual fixed payments, varying according to the examinations. 2. To aid and assist Committees in the provinces desirous of establishing Schools of Art. 3. To hold public inspections and examinations, and to award medals and prizes to the most deserving candidates. 4. To collect together works of art, pictures, &c., of the schools and book clubs established in the central Library. 5. To circulate among the Schools of Art objects from the Museum, and books and engravings from the Library."

The buildings at South Kensington include the offices of the Department, the Training School for Masters and Mistresses, the Normal Central School of Art, the Art Library, and the various Art collections.

The Training School has for its special object the education of Art-teachers of the class already mentioned, became in 1854 the property of the Government. The students have full access to the Museum and Library, either for consultation or copying, as well as to all the public lectures of the Department. Special classes are arranged in this School for master-masons and schoolmistresses of parochial and other schools to teach elementary drawing as a part of general education.

The collections brought together at South Kensington are already of great value and interest, and they are rapidly increasing. The Museum of Ornamental Art has been formed entirely by the Department. It was commenced in 1858, when a suite of rooms in Marlborough House was appropriated to this purpose. It was removed to the new buildings, South Kensington, in February, 1857. It embraces the entire circle of the arts, and is open to the public at a modest admission. The existence of majolica and other examples of ancient, as well as many most admirable specimens of modern, ceramic ware; a fine collection of old furniture of an artistic character; watches, jewellery, and enamels; stained glass windows; casts, engravings, and photographs of fine specimens of ornamental art from the Imperial Collections of France and elsewhere; casts of classical, medieval, and renaissance architectural ornaments, &c. There are also deposited in the Museum buildings, trade collection of animal productions, educational collections, models of patented inventions (deposited here by the Commissioners of Patents); a collection of original statues and casts by British artists, lent for a stated period by the sculptors or owners of the works, &c., to make the Department accessible to youth about to enter on a seafaring life. Besides these three in London, Trade and Navigation Schools have been opened in nine of the principal ports, and could be readily established in other shipping towns if the Department could train masters fast enough to meet the demand. One of these schools had "its present locality," when Dr. Playfair wrote, "somewhere in the ocean between England and India;" Mr. Green, of Poplar, having fitted out "one of his finest ships as a School of Navigation, carrying a number of the midshipmen under one of our [the Department] masters, who is bound also to instruct the common sailors in the principles of navigation." An example which might be well followed in this respect.

In connection with the Central School of Art there are seven Metropolitan District Schools, and one school for female students only. The provincial Schools of Art have increased greatly in number since the formation of the Department. These schools, combined with the Art sections of the Department, are, in the words of the official programme—"1. To train male and female teachers to give instruction in Art, to certify them when qualified, and to make them annual fixed payments, varying according to the examinations. 2. To aid and assist Committees in the provinces desirous of establishing Schools of Art. 3. To hold public inspections and examinations, and to award medals and prizes to the most deserving candidates. 4. To collect together works of art, pictures, &c., of the schools and book clubs established in the central Library. 5. To circulate among the Schools of Art objects from the Museum, and books and engravings from the Library."

The buildings at South Kensington include the offices of the Department, the Training School for Masters and Mistresses, the Normal Central School of Art, the Art Library, and the various Art collections.
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drawing and painting to upwards of 35,000 students—but this number "includes children in poor schools under instruction in drawing," who can hardly in fairness be ranked as Art-students. The Department, in fact, now, besides the training which it affords in its central and metropolitan schools, and the Special Provincial Schools of Art in connection with it, proffers the services of a certified teacher in drawing to any school or schools, furnishing an aggregate of 500 children with a teacher for drawing; and is prepared to aid such schools of examinations and prizes, at stated periods. It is intended also, as soon as arrangements can be made, further to extend the aid of the central institution to local schools and provincial towns, through the招股 of objects of study set up in the Museum for exhibition and study upon application from the local authorities.

SCIRE FACIAS. A simpler, less expensive, and less dilatory method of proceeding than that by "cites facias," has been provided by the Common Law Procedure Acts, 1851 and 1853. The former statute has at the same time extended the period during which execution may issue, from a year and a day to six years. In case of a change by death, marriage, bankruptcy, or otherwise, in one of the parties to an action, the representative of that party may enter a suggestion of the fact, and put himself in his place. The opposite party is also enabled to call upon the representative to do so, and if he fails to stop the proceedings. The proceeding by suggestion on the rolls is adapted similarly to the parties. If it be not adopted, a writ of Review, as it is now called, may be issued, the object of which is the same as that of a "cites facias." It is however directed to the party and not to the sheriff, and is an action at law, not a suit in equity, and is directed to the sheriff of the county where the sense in the original action was laid, and was served by him. The subsequent proceedings in Review resemble those of an ordinary action. The writ of "cites facias" in Chancery to repeal patents is not affected by the above-mentioned statutes. Nor is the writ of "cites facias," itself abolished. In some cases it is still the only method of proceeding; for instance, to enforce a judgment against the terre ten sizes of a tenant in common.

SCILITIN. [Chemistry, S. 1]

SCITAMINACE., a natural order of plants embracing the Marantaceae, with 1 anther-valve, and the Zingiberaceae, with 2 anther-valves. The separation of these orders is now generally recognised. [Marantaceae; Zonoberaceae.]

SCOMBREDUSX., a genus of fishes belonging to the family Exocoj. The only British species of this genus is the far Pike or Skipper, called also Goodswin in Southland. It was first described as a British species by Ray. It is not often caught in the Thames, Berwick and Yarmouth, and Portland Island, and on some occasions has been even plentiful on the coasts of Scotland. [Exox.]

SCOPHELA., a family of Malacozygious Abdominal Fauna. They are closely shelled. They have the snout short, the mouth deeply cleft, the teeth rather small and sharp; the branchial rays 8 to 16; the first dorsal behind the ventral; the body in some is semitransparent. The genus Scopelus is found in the Mediterranean. (Manual of Natural History.)

SCORESBY, WILLIAM, was born in 1790, and commenced his nautical life only ten years afterwards, accompanying his father, William Scoresby, likewise a disting- guished navigator, in the Dundie, on her voyage of the year 1800. The passion for naval enterprise which the child's examination of the ship had evoked, was confirmed by his first voyage, and in 1803 the father and son sailed together in the ship Resolution of Whitsby. This they continued to do for the ensuing eight years, the sedulous junior keeping a regular journal of their voyages. He was promoted in succession, as he became qualified, without being unduly favoured, through all the gradations of the service, till he arrived at the command of one of the small 12' ships, which responsible office he held in his sixteenth year. The long intervals during which, from the nature of the whale-fishery, the ships were laid up in winter, were devoted by the father and son for the sanction and to the great satisfaction of his father, to researches into the organisation of various portions of two sessions, at Edinburgh, where he secured the friendship of the late Professor Jamieson and other professors of the university, and also of Dr. (now Sir David) Brewster. He thus acquired that definite knowledge of the principles of the various branches of science bearing upon his peculiar profession, which enabled him to extend them, by his own observations, in the voyages to the Arctic regions which alternated with and succeeded these periods of intellectual culture.

While filling the stations respectively of commander and chief-mate of the Resolution in 1806, the Scoresbys sailed to a higher latitude than had been reached before. In May of that year the ship bore down the eastern coast of Greenland, and in July left Spitsbergen at 70° 55' 20', inferior to that attained by the famous. ordinary sailing, and the honour still remains theirs of having in ordinary sailing navigated the highest northern latitudes. It may be remarked here that the boat expedition had itself been adopted from a suggestion made by the younger Scoresby (in a proposition which had been rejected by the Admiralty), but had not, in his opinion been properly executed. It was always his conviction that such an expedition, if carried out according to his views, the pole itself might have been arrived at; and in a later period he even favouring an object of learning that Party himself had expressed the same conviction. It is proper to note in this place, in order to preclude error, that the surgeon of the Resolution in this voyage, states, in an "Account of a Voyage amongst the Scoresby's," (now Scoresby,) in taking the achievement to himself, that the highest latitude attained was 81° 20', but this, as Dr. Scoresby has explained in his "Memoir of the Scoresby," p. 153, is erroneous; the highest latitude observed being 81° 12' 45', as already stated. The Resolution was the property of the late Sir Joseph Banks, President of the Royal Society, the attention of the council of that learned body and of the government was directed in 1817 to the dormant enterprise of endeavouring to reach the North Pole and discovering the long-sought North-West passage; the project was formed and applied for by Sir Robert MacClure in one of the recent searching expeditions for the ill-fated Franklin. Sir Joseph Banks was very desirous that his young but experienced friend should be engaged, and would not, in the face of his father having deferred the fitting out of the ship Falcon, the son to command, under the idea that she might be taken up for service. Their expectations however were altogether disappointed, and as is well known, Captain (the late Sir John) Ross with the Isabella and Alexander, Sir Captain Buchanan with the Dorothea and Trent, were appointed to make the attempt. It appears to be the policy, as perhaps to be recommended on grounds of national justice, however the consequences of it may be regretted in particular by the Board of Admiralty, to abandon all hazardous expeditions and others destined for marine scientific research, as the encouragement and rewards of an inevitably laborious and ill-paid service. The history of this subject will be found in a paper by Dr. Scoresby, "On some circumstances connected with the Original Suggestion of the Arctic Expeditions" published in the Edinburgh New Philosophical Journal, vol. xx. 1835-36.

Having made seventeen voyages to the Svalbard group of islands, and published a work in 1820, his celebrated work entitled, "An Account of the Arctic Regions, with a history and description of the Northern Whale-Fishery," in 2 volumes consisting of 1217 pages, illustrated by twenty-four engravings, it had been applied for a great service to scientific literature by stimulating his pupils and former pupils to make public the results of the observations made by them in their professional or official employment in distant countries. This was the first original work on the
physical and natural history of the countries within the Arctic circle and on the nature and practice of the Whale-fishery, published in this country, with the exception of a tract by Henry Elking on the latter subject. It obtained for the author a more general reputation than he had hitherto enjoyed. The Mental Philosophy of the Whale-fishery, commanded, in counteracting a degree of enterprise in geographical discovery—not connected however with the object of the trade—which had not before been united with the pursuit of whales, except through accidental circumstance, was the result of a voyage in whaling from a voyage in 1828, in the ship Baffin of that port, undertaken with these views, he received on entering the Mersey the afflicting intelligence of the decease of his (second) wife while he was absent. He now quitted the whale-fishery, but published the geographical and scientific results of his voyage, in a 'Journal of a Voyage to the Northern Whale-fishery; including researches and discoveries on the eastern coast of West-Greenland, made in the summer of 1829, in the ship Baffin of Liverpool,' Edinburgh, 1830, 615 pages, with 6 plates, including a chart, &c. A German translation by Professor F. Kries was published at Hamburg in 1835. Not long after the appearance of this work, on the 17th of June, 1834, he was elected a Fellow of the Royal Society, being also a member of the Philosophical Society of Manchester, and having been for some years a Fellow of the Royal Society of Edinburgh. He subsequently received one of the highest honorary rewards of scientific eminence, in being made a corresponding member of the Institute of France, or Académie des Sciences; and various questions were always presented to him he had been a remarkable man. His crews were always distinguished by their discipline and respectability, and the lasting effect of his command upon the characters of some of those who sailed with him was a proof of the soundness of his management. The whale-fishery was remarkable; but he never, under any circumstances, allowed a whale to be pursued upon Sunday, and he succeeded in convincing his men that upon the whole they did not lose by keeping the appointed day of rest. In 1836, he was one of the temperance principal on board his vessel, finding that hot coffee was a very much stronger preservative than spirits against the intense cold of Arctic regions.

Some years after his retirement from the whale-fishing the religious impressions which he had first received from his father and had always entertained, impelled him to desire a more formal and authorised position as a teacher of religion. He entered the University of Cambridge as a student of Queens' College, and in 1839 proceeded to the Master of Arts. Orders in due course, taking the superior degree of D.D. in process of time. The Mariner's Church at Liverpool having then been just established, he accepted the chaplaincy. Private circumstances occasioned his removal to Exeter, but the zeal with which he discharged the duties of his office in Yorkshire, after some years he however resigned this office, and retired to Torquay in Devonshire.

As a clergyman, Dr. Scoresby is stated to have "combined what may perhaps be considered extreme vantages with the most abounding charity and liberality to those who differed from him." His 'Discourses to Seamen' evince the earnestness with which he laboured for the good of the sea in which he had passed his earlier years. He took also enlightened and enlarged views of public education, which while vicear of Bradford he laboured zealously to realise. But of all the very various subjects to which Dr. Scoresby directed his attention, practical magnetism and its relation to navigation appear to have been most actively pursued by him during his life. The increasing quantity of iron introduced into the equipment and construction of ships, and the recent construction of the entire hull of that metal, were watched by him with increasing care; and all the resources of his cultivated mind were at length applied to the most important of all the great subjects of the science of navigation. His researches into the properties of ships upon their compasses, and the requisite correction of the indications of the latter. He had published various papers on magnetism in the 'Philosophical Transactions,' the 'Society of Arts' Reports of the British Association,' the 'Edinburgh Philosophical Journal,' and the two journals which succeeded it. The substance of these, or of many of them, he now made public, in an improved form, in his 'Magnetical Investigations,' Part I. Comprising investigations on the principles affecting the capacity and retentiveness of steel for the magnetic condition; with the development of processes for determining the quality and degree of hardness of steel. London, 1839; 292 pages, 2 plates. Part ii. 'Comprising investigations concerning the laws or principles affecting the power of magnetic steel-plates or bars in combination, as well as singly, under various conditions as to mass, hardness, quality, form, &c., together with some interesting facts respecting cast-iron.' London, 1843; 290 pages, 2 plates. Vol. ii, part iii, 'Investigations, with illustrative experiments, on the nature and phenomena of magnetic induction, and the mutual influence of magnetic bodies. London, 1852; 480 pages. To the section of Mathematics and Physics, at the Opening of the British Association at Glasgow in 1855, he communicated a summary of his matured views, and of the evidence in their favour which had occurred since their original presentation. 'Investigations, Principally on the Magnetism of Iron ships and its changes.' In this he recalled attention to his plan of a compass alaft, as affording a simple and effective mode of ascertaining the direction of a ship's course, stating that it had not only been extensively adopted by some of our first friends in the building and property of iron ships, but had received the particular sanction and commendation of Mr. Airy, the astronomer, and of Lieutenant M. F. Manly, the American hydrographer, who had recommended it by both these gentlemen for adoption for determining the position of the vessel, or the correction of adjusted compasses whenever they might be found to be in error. In the further prosecution of his researches on this subject, and with the view to determine the specific magnetic quality of iron, he made a voyage in his ship at the Austral in 1857, and at the 21st of March 1857, aged sixty-seven, and leaving a widow.

Three principal scientific works of Dr. Scoresby have been described above. The following enumeration will render the account of his separate publications nearly complete. 'Memorial of an Aërotectic and Dutiful Son, Frederic R. H. S., who fell asleep in Jesus, December 31, 1834, aged 16 years.'—Discourses to Seamen: consisting of Fifteen Sermons, preached in the Mariner's Church, Liverpool, for the most part generally on subjects of Christian Practice and Doctrine. "—Isowlad glorified in his Works: a Memorial of a Merciful Instructor, and a Loyal Servant of his Country. August 4, 1850, on occasion of the Meeting of the British Association."—Memorials of the Sea ': 1, 'Sabaths in the Arctic Regions'; 2, 'The Mary Russell.' Of both these editions have appeared. 3, 'My Father: being Records of a Life of Robert H. Scoresby, 1807-1877.' Whitby, 12mo, Lond., 1851, pp. viii. and 322. 4, 'The Franklin Expedition,' stating his views on its probable course and fate, and on the measures for search for it. "—Polar Researches; or, the Natural History of Plants belonging to the natural order Asteraceae. The pappus is feathery, in several rows. Brist's imbricated. Reception naked. Achenia neither stalked nor beaked, with a lateral scar. S. Hapsonia, Viper's-Grass, has a cylindrical succulent root, branched monopodically leaves annual, lanceolate, wide, involucres smooth; flowers yellow. It is found

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in Spain and the south of Europe. The root is said to be
and eatable, and is supposed to be
a specific against viper bites.

*G. saltifolia* has roots similar in quality.

*G. dulcis* is cultivated as an esculent at Palermo, and the
gummy root of *G. tenuifolium* is eaten by the Kalmucks.

SCOTOPHILUS. [Chiroptera.]

SCOTT, DAVID, was born in Edinburgh, October 10, 1806. The son of a landscape engraver, he was brought up to the
trade by his father, but he was sketched and drawn incessantly, and at length his father yielded to his desire to become a painter. From this early ambition he was skilful in the 'grand style.' His early pictures were of subjects such as the *Hopes of Early Genius and the Spirit of Loli,* and of *Lot and his Daughters flying from the Cities of the Plain.* Of a melancholy turn of mind, and of somewhat gloomy theological views, his pictures naturally were a sombre air, and attracted few admirers beyond the circle of his friends. His *Lot and his Daughters* was returned from the British Institution as too large; his series of outline etchings, *Monograms of Man,* met with a slow and unremunerative sale; and it was not till 1831 that he sold his first picture. But he loved labour, and he went on painting subjects with which few could sympathise, in a manner that did little to remove the unattractiveness of the theme. Slowly however he made his way, finding ardent if not numerous admirers; and he was now privileged, be it to his fellow-citizens. In 1832 he visited Italy, staying awhile at the Louvre on his way. In Italy of course his chief stay was at Rome, but the amenities of Raffaele seem rather to have repelled him, his chief attention, characteristically enough, being directed to the engraving of the façade of St. Peter's, to the acquisition of the leading resident artists; he worked hard, and painted much; and his power in painting was evidently enlarged. His style however was not materially changed. He continued to paint in the 'grand style' pictures of heroic size; and even when he stooped to the simpler realities of life, or to such matters as 'Love whetting his Darts,' *Ariel listening to the Mermaid,* 'Beauty wounded by Love,' the *Triumph of Love,* and the like, it was not the use of as an object of an altogether different character. In the acquaintance of his themes he entered upon with more congenial feeling were such as his *Genius of Discord* (a large work, painted at Rome, but repainted on his return); *Descent from the Cross,* *Jane Shore found Dead in the Street,* *Orestes pursed by Furies,* *Achilles mourning over the Dead Body of Patroclus,* *Paracelus, the Alchemist,* in his Lecture-Room; *Hope passing over the Horizon of Despair,* *The Dead rising at the Crucifixion,* *Peter the Hermit addressing the Crusaders,* and several others, which all attest his remarkable diligence and his soaring ambition; but which, in their want of power to interest the spectator, and their artistic shortcomings, too clearly show that lofty ambition, strong imagination, and unwearied industry, are insufficient to give a purpose, even when a well-directed purpose, and carefully disciplined technical skill. Mr. Scott had built himself a large studio in Edinburgh, and was full of dreams of future glory, despite the warnings of failing health, when the cartoon competition in connection with the new houses of parliament aroused his feelings to a high pitch of excitement. He prepared and sent in a large cartoon of *The Defeat of the Spanish Armadas* upon which admired the judges who awarded the prizes, and the block upon which the cartoon was taken, of similar in its intensity to that which the like fate inflicted upon Hayden—whom in his ambitious thoughts, and passion for grand art and huge canvases, Scott greatly resembled. But Scott had died; he devoted now all his energies to his largest and perhaps, on the whole, best work, *Vasco da Gama encountered by the Spirit of the Storm in passing the Cape,* now in the hall of the Trinity House, Leith. This work occupied him during the last ten years of his life, and he lived only to complete it. In 1840, he was forty-third year. Some of his great works have been purchased for public institutions in Edinburgh. Scott was a vigorous writer both in prose and verse. His *Essays on the Character of the Best Masters* excited a good deal of attention when first published in 'Blackwood's Magazine,' 1840; and some of his poetry is contained in the *Memoir of David Scott, R.S.A.,* containing his Journal in Italy, Notes on Art and the Theatre,* Svo, 1860. This *Memoir* is a warm-hearted tribute to his worth and merits by his brother, Mr. William B. Scott, himself an artist of considerable ability.

SCEMNER. [Palamedea.]

SCREW-PINE. [Pandanus.]

SCRYMBLASH. [Gogoleia, s. 1.]

SEA-BREAM. [Pargelia.]

SEA-CRAWFISH. [Pentaste, s. 2.]

SEA-CUCUMBER. [Pentaste, s. 2.]

SEA-DACE. [Ibrax.]

SEA-DORDER. [Oxuders.]

SEA-ELL. [Aletupa.]

SEA-PEA. [Vicker.]

SEA-REEF. [Prama, s. 2.]

SEA-ROCKET. [Caste, s. 1.]

SEA-SORCIP. [Cott.]

SEA-SNAIL. [Docolos, s. 1.]

SEA-SPAITE. [Centricrus.]

SEBACIC ACID. [Chiristyan, s. 2.]

SEBASTIANI, HORACE FRANCOIS, COUNT, was a native of Corsica, having been born at the hamlet of Porto, near Bastia, on Nov. 11, 1776. His uncle, who was a priest, took charge of his education, and was preparing him for his own profession, when the call to arms, in 1792, induced him to resign. He then became engineer for General Casabianca, after which he joined the army of Italy, in 1796, was noticed by Bonaparte, and we made a chef-de-bataillon at the battle of Arcola. In 1796 he distinguished himself greatly at Verona, for which conduct he was appointed to a regiment on the field of battle. On the 16th Brumaire, being in garrison at Paris, with his regiment of Dragoons, he assisted in the coup d'état by which Bonaparte became master of France. The First Consul promptly rewarded this proof of devotedness on the part of his comrade, and henceforth took charge of his fortune.

After the battle of Marengo (June 14th, 1800) Colonel Sebastiani was appointed commissioner along with Marcetot of the Russian prisoners of war, a post that brilliant corps entered the Austrian capital. At the battle of Austerlitz he displayed his habitual energy, was badly wounded in a desperate charge, and was raised to a division for his conduct. During the next few years he was employed with much distinction in directing his division against the Russian army, and was killed, his wife, who died in giving birth to a girl, afterwards known as the unfortunate Duchesse de Praslin, murdered by her husband in 1847.

General Sebastiani was one of the many French officers sent to Spain to retrieve the fortunes of the Emperor, in 1809. He crossed the Guadarrama, and defeated the Spanish at Ciudad-Real, at Santa Cruz, and several other places. In the early part of 1810 he took possession of the provinces of Aragons, Murz, and Majorca, and he accused of having greatly mutilated the Alhambra and other monuments of antiquity, and of ransacking the convents for his own private gain. In the following year, not deeming his services sufficiently appreciated, he returned to France. Napoleon I, who considered the chief talents of this general to be diplomatic rather than military, had determined not to give him a command during the Russian campaign. But the remonstrance of Sebastiani overcame this decision; he was therefore sent to the Russian army. During the march to Moscow he strongly urged upon the Emperor the prudence of wintering in the province of Littuania; but this advice was unheeded. General Sebastiani was present at all the battles of Smolensk and Moscow; he held the post of the first to enter the Russian capital, at the head of the Red corps. He suffered greatly during the retreat, lost all his artillery, and all his horses perished in the snow.

In 1810, after the battle of Leipzig, at which he was wounded, he contributed to the victory at Hanau, when...
Prince Wrede was defeated. Napoleon afterwards gave him the command of the 5th corps, and ordered him to defend the left bank of the Rhine, at Cologne; but he was obliged to fall back into Champagne, where, at the head of three regiments of cavalry of the Imperial Guard, he repeatedly won new honours, particularly at the battles of Arcis-sur-Aube and Saint-Dizier.

On the retirement of Napoleon he retired to private life, but during the Hundred Days he became a member of the Chamber of Representatives, and was sent as one of the deputies to wait on the allied sovereigns after the battle of Waterloo. After the return of the Bourbons he spent a few months in Paris, afterwards resided in the country, and when he included his name in their list of subscription. In 1819 he was chosen deputy for Corsica, and soon became distinguished as a member of what was termed the liberal opposition in the Chamber of Deputies. In 1820 he succeeded General Foy as representative of the 1st section of Paris. After the revolution of 1830, Louis Philippe, in August, appointed him minister of marine, and in the following November, on the retirement of Molé, made him minister for foreign affairs, in which office he continued until 1832. It was during his administration of this office, in September, 1831, that he incurred so much obloquy by his famous announcement from the tribune of the chamber that "order reigns in Warsaw." In 1833 he was appointed consul for a short time the office of minister for foreign affairs, and on his return to Paris had a difficult task to confirm the treaty he had made with the United States of America, and was appointed ambassador to Naples. In 1835 he was sent ambassador to London, where he was replaced by the Duke of Angoulême, who in a few months received his bâton de Maréchal after 45 years service. In 1841 he spoke strongly in the chamber in favour of the project for fortifying Paris. Ill health compelled him soon afterwards to retire from public business, and the unfortunate fate of his daughter, the Duchesse de Praslin, darkened the latter years of his life. He died however suddenly while at breakfast, on July 20, 1851. He was buried in the church of the Invalides, and during the funeral some of the hangings caught fire, and the building, but the fire was fortunately subdued with only the loss of several of the military trophies.

SEBASTEN PLUMS. [Conrad, S. 2; Cordiaae.]

SECALE, a genus of Grasses, to which the cultivated Rye belongs. The flowers are arranged on a spike; the spikelets are 2-flowered, with a long stalked rudiment of a third floret; the glumes are subulate. In other respects this genus strongly resembles Tribicum, to which the Common Wheat belongs. [Triticaceae.]

S. cereale, Rye, has the glumes 1-nerved and shorter than the spikelet; the rachis is very tough. This plant is extensively cultivated in Europe, and nowhere has been observed in a truly wild state, away from the possibility of escape from the field. It is deciduous in winter. [Ryce.]

S. montanum has the rachis hairy, brittle; glumes with a short point; the root fibrous. It is found on the gravelly mountains of Sicily.

S. milletus is also a European species, in which the spikelets are 4-flowered, and the glumes have 2 or 3 strong ribs. It is found in France.

SECRETIONS OF PLANTS. [SECRETIONS, VEGETABLE.]

Although the term secretion is generally connected with the idea of separating for the purpose of throwing off or getting rid of a product, it is very manifest that such a use of the term would restrict its application to the substances which, amongst animals, are called excretions. It does not appear that the term is in use in a more restricted sense than another in the vegetable kingdom. It is true that a theory of the practice of 'rotation of crops' supposes it to depend on poisonous excretions given off by the roots of one plant which are not poisonous to another. But the facts brought forward to support this theory are doubtful, and other explanations of the necessity of rotation have been given. [Root.]

In plants the organs of secretion are simpler than those of animals, as they have no specialized ducts for carrying the secretions as the blood. This function, however, seems to be performed in both plants and animals on the same general plan. It is in both cases in the interior of the cell that the most remarkable instance of the process takes place. For this reason the terms 'plant' and 'animal' are frequently used in植物 physiology. The chemical forces in action during secretion are stronger than in animals. All the important secretions of plants are compounds of the four organic elements: carbon, hydrogen, oxygen, and nitrogen. These enter the plant in the form of carbonic acid and ammonia. Out of these compounds the various substances are formed. The principal of the wood of plants, the nutritious value to their seeds, roots, and other parts, the colour and scent of their leaves and flowers, with the medicinal virtues of many special plants, are formed. The substances secreted are generally distinguishable, and may be divided into two great classes.

First, Nutritive or Assimilable Secretions, that is, substances which have been formed in the plant, and are used for forming its tissues, and constructing the mass of which it is composed. The principal of the wood of plants, the nutritious value to their seeds, roots, and other parts, the colour and scent of their leaves and flowers, with the medicinal virtues of many special plants, are formed. The substances secreted are generally distinguishable, and may be divided into two great classes.

The second class of substances are called Non-Assimilable or Special Secretions of Plants. They are substances which are not found in every part of every plant. When once formed are never recorded in the stock of the plant, and are never converted into the nutritive secretions; hence they are called non-assimilable. Some of these substances are very generally diffused amongst plants, as chlorophyll, which is found in all the green plants; others which give the peculiar green to the leaves and other parts of plants. [COLORFULITY, in Fig. 1.]

These secretions are very numerous, and may be classed under certain general heads.

1. Colorant. To this head may be referred chlorophyll; the colouring principle of the petals of plants seems also to be a modification of this substance. There are however other colouring matters in plants, such as those used by the dyer, and which do not give any colour to the plants in which they exist, which have nevertheless a very definite chemical composition, and by combining with various other substances produce the colours used by the manufacturers of coloured cotton, linen, silk, and woollen cloths of various colours. Various substances are termed dyers' stuff, from the decomposition of the assimilable secretions, as many of them bear a close relationship to both the ternary and quaternary forms of these secretions.

2. Acid. Plants which having an acid reaction, and capable of combining with the oxides of the metals, are very common in the vegetable kingdom. The most familiar are those which occur in fruits, as the oxalic, citric, mellow, and tartaric acids. Oxalic acid is found in the Oxalis Acetosella, hence its name, and other forms of Oxalaceae. It is also found in the Cactaceae and Polygonaceae. In the latter order it exists in the species of Rhamnus (Rubarb), used for making pies, and also in the Sorrel (Rumex). In all these cases it is combined with the oxide of some metal, either potassium or calcium. In sorrel (Rumex acetosella) it exists as a quinon-ol or superoxide of potassa, which, when separated, is called Salts of Sorrel. In the Cactaceae it exists as an insoluble oxalate of lime, in the form of raphides. These substances are very common in the vegetable kingdom. Citric Acid is found in the fruits of the order Aurantiosae, as the lemon, orange, lime, shaddock, &c. It is easily separated from these fruits in a crystalline form. It is soluble in all its combinations with the oxides of the metals, hence it does not occur as oxalic acid in the form of raphides. Tartaric Acid is found in the juice of the grape. Though closely resembling citric acid, it differs in forming an insoluble compound with potassa. Various substances that give the peculiar green to the wood of the tartar of the shops. This salt is deposited whenever grape-juice is allowed to stand. It forms the basis of the tartar of wine procured from the lees. This property of tartaric acid makes the juice of the grape the most efficient compound for the manufacture of wine. This is tasted in the formulation of citric acid, whose salts are soluble, are much less suited for wine-making. Malic Acid is the acid found in the apple,
and which gives the sour taste to verjusce, as also to the fermented juices of the apple and pear—cider and perry. The chemist has discovered that there is a very large number of organic acids as present in plants, and every day is increasing their number. Many of the colouring matters appear to be acids, which assume their particular colours by combination with metallic oxides, such as the lactic, orvallic, ethyrlic, and parele acids, obtained from lemons, used in making curd cheese and archil. The vegetable alkali's, or alkalois, are also found in combination with acids; thus, ascorine is found in combination with acetic acid, morphia with meconic acid, and a variety of others.

The acids generally occur in combination, and sometimes supplant each other. Even mineral acids will sometimes take the place of organic acids; thus sulphuric acid is sometimes found combined with morphia in the place of meconic acid. On the other hand, the metallic oxides will sometimes take the place of the alkalois, and be found in combination with the organic acid. In the instance however of gallic and tannic acids, there appears to be no combination with alkali's or alkalois. Tannic acid, formerly called tannine, is found very generally present in most woody parts of plants. They are supposed to result from the decomposition of cellulose. Theoretically, it may easily be formed out of carbonic acid and water. Whether it passes through the stage of cellulose is doubtful. It is of great use in the arts, especially in tanning leather, and for these purposes it is obtained from the bark of elm, oak, willow, sumach, and other trees. It exists in the fruits of the Carya, and the legumes which are called 'divi divi.' The vegetable extracts called catechu, or cutch, and the exudations which are sold by the name of kols, are all composed of tannic acid. This acid is converted into gallic acid by oxidation. Such a process takes place during the formation of the galls produced by the puncture of insects in the buds of many of the species of oak, and the hornbeam.

These excrencences are called gall nuts, and from the presence of this acid in them it has been called gallic acid. [Gall.] The alkaloids are substances found in the leaves, fruits, bark, and other parts of plants. They are some of them organic, others mineral; but most of them are of the latter class, and more generally diffused. Many of them possess extraordinary properties in relation to the animal kingdom, producing poisonous effects: such as strychnia, from the Strychnos Nux vomicae; morphia, from the Papaver somniferum; quinina, from the Coixs matthiali. These substances are always found in combination or organic or mineral acids. There is however another class of substances closely resembling these in their composition and action, which do not contain metallic oxide, and which are called organic substances: such as theine, the principle found in tea, coffee, and Paraquay; and theobromine, the principle of cocoa. The volatile oils are another group of secretions of great interest. They differ in composition and character from the mineral acids, and are not susceptible of the same action by secretions. They are many of them used as perfumes—others as stimulant medicines, and are remarkable for the interesting compounds they can be broken up into by the agency of chemistry. Their investigation is throwing much light on vegetable chemistry. [Oils.]

The resins are a group of substances standing in a similar relation to the fixed oils, as the volatile oils. They do not appear to be assimilable, they are only occasionally formed, and present special properties in particular plants. They are generally composed with gum, forming the substances called gum-resins, and from this combination it may be supposed that they are directly formed from the tertiary assimilable secretions. When occurring with gum, as in the case of the gum-resins of the Umbelliferae, or without gum, as in the resins of the Coniferae and in Myrrh, they are combined with volatile oils, which appears to give them their peculiar odours, mavour, and action. In the Coniferae the volatile oil they are combined with is the same in most species, and is in fact none other than the same type of oil with which, we are at present acquainted, we can readily explain their formation from the carbonic acid, water, and ammonia, taken up by plants, and the loss of oxygen. The following tables illustrate this process, with regard to several of the substances mentioned:—

**TABLE OF SUBSTANCES FORMED FROM CARBONIC ACID AND WATERS, BY THE LOSS OF OXGEN.**

<table>
<thead>
<tr>
<th>Substance formed</th>
<th>Carbonic acid used in eqs.</th>
<th>Water used in eqs.</th>
<th>Oxygen lost in eqs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxalic Acid (dry)</td>
<td>C₂H₂O₄</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>Gallie Acid</td>
<td>C₆H₄O₇</td>
<td>3</td>
<td>0.75</td>
</tr>
<tr>
<td>Tartaric Acid</td>
<td>C₄H₄O₇</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>Maleic Acid</td>
<td>C₄H₄O₆</td>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>Citric Acid</td>
<td>C₆H₄O₇</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>Memonic Acid</td>
<td>C₆H₄O₇</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>Starch</td>
<td>C₆H₁₂O₆</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>Cane Sugar</td>
<td>C₆H₁₂O₆</td>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>Glucose (dry)</td>
<td>C₆H₁₂O₆</td>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>Quassine</td>
<td>C₆H₁₂O₆</td>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>Oil of Tarronope</td>
<td>C₁₀H₁₆O₆</td>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>Oil of Juniper</td>
<td>C₁₅H₂₂O₆</td>
<td>1</td>
<td>0.25</td>
</tr>
</tbody>
</table>

**TABLE OF SUBSTANCES FORMED FROM CARBONIC ACID, AMMONIA, AND WATER, BY THE LOSS OF OXYGEN.**

<table>
<thead>
<tr>
<th>Substance formed</th>
<th>Carbonic acid used in eqs.</th>
<th>Ammonia used in eqs.</th>
<th>Oxygen lost in eqs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asparagus</td>
<td>C₃N₂H₂O₄</td>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>Indule</td>
<td>C₆H₁₂O₆</td>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>Nitroes</td>
<td>C₆H₁₂O₆</td>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>Cussine</td>
<td>C₁₀H₁₆O₆</td>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>Morphine</td>
<td>C₁₅H₂₄O₆</td>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>Quinine</td>
<td>C₁₅H₂₄O₆</td>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>Strychline</td>
<td>C₁₅H₂₄O₆</td>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>Thebromine</td>
<td>C₁₅H₂₄O₆</td>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>Alkohol</td>
<td>C₁₅H₂₄O₆</td>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>Cateine</td>
<td>C₁₅H₂₄O₆</td>
<td>1</td>
<td>0.25</td>
</tr>
</tbody>
</table>

It should not however be lost sight of that other elements besides the four organic are constantly found present in the secretions of plants, such as paraffin, and phomium, from the leaves, grasses and albellums. The alkales and alkaline earths are found very commonly associated with all these secretions, and it is very certain that plants will not form their secretions unless the inorganic elements are present. [Chem. of Plants:]

**SEDE, SEDES. [Claudium, S. 1; Cypræacum.]**

**SEDGELEY. [Staffordshire.]**

**SEINE-MARITIME, a department in France, recently constituted with Havre for its chief town, extends along the coast of the English channel from the Seine to the Bresle. It is formed out of the coast portion of Seine-Inférieure, which bounds it on the south. The Bresle separates it from the department of Somme. It is divided into five arrondissements, Havre, Le Havre, Yvetot, Dieppe, and Fecamp. Goury, a small coast village, east of Trouport, are made chief towns of cantons. The tribunal of commerce of St.-Valery is suppressed, and that of Yvetot transferred to the more important town of Bolbec. A change has also been made in the limits of Seine-Inférieure, to that portion of the territory of the department of Eure that lies east of the Seine to the Epte is added. Seine-Inférieure, by this arrangement, has Seine-et-Oise to the south-east; and out of the new territory two new arrondissements, Eilbaupt and Goury, are chiefly formed. At Goury, the railways authorised to be made from Amiens to Rosen, and from Bernay to Trouport, through Annule, are to meet. In the absence of any official return, it is useless to offer any conjectures on the number of the new department; though these may be very nearly ascertained by consulting the articles Eure and Seine-Inférieure, which have been described as they stood previous to the recent alterations.

**SELENALDINE. [Chemistry, S. 2.]**
S E N
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BENEQUINE. [CHEMISTRY, S. & T.]
SEPARATE PROPERTY. The savings and earnings of a wife may become her separate property at law; and she may deal therewith as a feme sole, either where an order has been made to that effect under the statutes 30 & 31 Vict. c. 55, or a judicial separation has been obtained by the wife. [Divorce, S. & T.; Justice of the Peace, S. & T.]

SEPARATION, JUDICIAL. Until the statute 20 & 21 Vict. c. 65, divorces a vinculo, which put an end to the marriage altogether, were only obtainable by a special Act of Parliament. The system has been adopted by men who have a husband, until after a sentence of separation a mensa et thoro in the ecclesiastical court, and would not pass at all if his conduct had not been free from reproach. [Divorces.] Either of the spouses could always however obtain on the ground of adultery, cruelty, and certain other causes, a divorce a mensa et thoro.

The remedy now given in such cases by the Court for Divorce and Matrimonial Causes is termed a judicial separation. The divorce a mensa et thoro does not dissolve the marriage; it does not bar the wife of her dowry, for instance; it effects only such a separation of the parties as leaves it open to them to come together again. But it relieves the husband from all liability for his wife; and it comes into play only in cases where the parties having and disposing of her own property and earnings, as freely as if she were a feme sole.

This kind of separation may be obtained on the ground of adultery or cruelty, or desertion without cause for two years or upwards, but unlike a decree for a divorce a vinculo is always possible. The less of judicial separation may be reversed at any time afterwards, if obtained in the absence of the defendant, on its appearing that there was reasonable ground for the alleged desertion.

In cases either of divorce or judicial separation, the Court may, if it shall think fit, order that the husband shall secure to the wife such sum as it shall deem reasonable. The allowance which may thus be made to a woman for her support out of the husband's estate, is to be settled at the discretion of the court, having regard to the probable future means of each of the parties, and to be proportioned to the rank of the parties. [Divorces, SIR ROBERT, F.R.S., the distinguished naval architect, received his education as a shipwright under Sir John Heath, surveyor of the navy, and continued in the service with the important service of our dock-yards during a period of fifty years. He was the author of many improvements in the first order in our naval architecture, including the system of diagonal bracing, which was devised while he was master shipwright of Chatham Dockyard. This system formed the subject of two memorable papers in the 'Philosophical Transactions' of the Royal Society, for the years 1814 and 1816, one by Sir R. Seppings in each of those years, and one by Dr. Thomas] in the former, and which attracted an unusual amount of public attention. The great principle of this method was such an arrangement of the principal timbers as was designed to check the tendency of the ribs and other timbers in every part of the ship, thus firmly compacting together the entire fabric, and preventing that perpetual racking of beams and working of joints which in the ancient system of ship-building, produced hogging, cracking, leakage, and rapid decay; and filling up likewise every vacancy between the timbers, which are occasionally the unavoidable receptacles for foul air, filth, vermin, and various other sources of rottenness and disease. These important improvements, though opposed to the ineradicable prejudice of the old system, were gradually adopted, but not sufficiently valued and understood, in this country at least, the just principles of mechanical action, in the practical operation of ship-building, were universally adopted in the maritime countries of the North Sea, especially that of Mr. Charles York, and the powerful advocacy of Sir John Barrow in the 'Quarterly Review,' and the merit of their author was acknowledged by his appointment as surveyor of the navy, and by the award of the Copley Medal of the Royal Society, which he became a Fellow on the 10th of November, 1814.

While the claims of Sir R. Seppings to the invention of the system of diagonal bracing in naval architecture is indisputable, it may not be out of place to record here the following point of information. It can be made a demonstration of the merits of discoverers or inventors to show that their progress in a portion of the general advance of the human mind. Sir John F. W. Herschel has stated in a letter to Mr. G. R. Weld, Associate, R.C.S., inserted in the 'History of the Royal Society' by the latter, that he is "disposed to think that the system of triangular arrangement adopted by Sir W. Herschel in the wood-work of his great telescope, being a perfect system of diagonal bracing, or diagonal approach, was independently invented by the "diagonal bracing," which system owes its strength, was original with his father at the time of its construction, that is about the year 1766.

Sir Robert Seppings introduced other improvements into the science of naval architecture. The admiral of the fleet presented him with 10,000 as a reward for his simple yet most useful invention of an improved block for supporting vessels, by which their keels and lower timbers were much more easily adjusted and prolonged or repaired. It was produced while he filled the office of master-shipwright assistant in Plymouth dockyard, and is described in the 'Transactions of the Society of Arts' vol. xxii. p. 275-252, the Society having awarded him their gold medal for it in the year 1804. His plan for lifting masts out of the steps, which superseded the employment of sheers hulk for that purpose, has been the means of saving much expense and labour. His new mode of framing ships has led to a much more extensive use of short and small timbers, which were formerly of little value; but the most important of all his improvements in the system of building ships. Sir Robert Seppings having been made a fellow of the Royal Society, in 1817, he was presented by his students with the sum of 500, and a plaque, on which was engraved his portrait, in addition to his official emoluments, and he received the marked approbation of both houses of parliament.

Foreign nations were not tardy in acknowledging the value of the improvements in ship-building originated by Sir R. Seppings, and his author received many substantial proofs of their sense of his merits; the Emperor of Austria, and the kings of Denmark and Holland, presented him with memorials of their appreciation of what he had done for their respective navies. He died in his 82d year; was buried in the national record of the great benefactors of their country, there are few names which will deserve more grateful commemoration than that of the object of this notice. In addition to the papers on the diagonal bracing already alluded to, Sir R. Seppings presented the Society with a sketch of a scheme of constructing ships in the mercantile navy, which was inserted in the 'Philosophical Transactions,' for 1820. Dr. Young's paper, also referred to above, though not communicated to the Royal Society, in 1814, had been presented in the form of a report to the Board of Admiralty in 1811. It will be found reprinted in Dr. Peacock's edition of the 'Miscellaneous Works' of Young, (vol. i. p. 562-568) together with the official correspondence relative to it between the latter and Sir J. Barrow. Sir R. Seppings was an honorary member of the Cambridge University Philosophical Society, and a corresponding member of the Philosophical Society of Rotterdam. It had been proposed by the University of Oxford to confer upon him the honorary degree of D.C.L., at the commencement of the ensuing year, but the health of Sir R. Seppings failed him to decline it. He died at his house at Taunton in Somersetshire, on the 20th of April 1840, aged seventy-two, leaving several children; his wife's decession had taken place a few years before.

BERICA. [MELOLITHOM.] SERICOSTOMA. [PHLOIPEN]. SERICULUS. [MERULIDE].

SERPENTINE. As a mineral Serpentine occurs, although rarely, in the UK, being a fairly fine-grained mineral and compact in texture, and of a dark-green or blackish-green colour. It also occurs in fibrous and lamellar varieties. Its hardness is 2.5 to 4, and it may be cut with a knife. Its specific gravity is 2.5 to 2.6, it becomes yellowish-gray on exposure, and feels sometimes a little mucous. The following varieties are recognised:—

Precious Serpentine.—Purer specimens of a rich oil-green
colour, and transmittant, breaking with a splintery fracture. It is a red-brown stone when polished. It has the following composition—

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silica</td>
<td>42.3</td>
</tr>
<tr>
<td>Magnesia</td>
<td>44.2</td>
</tr>
<tr>
<td>Protioxide of Iron</td>
<td>0.8</td>
</tr>
<tr>
<td>Calc. Acet.</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>12.4</td>
</tr>
</tbody>
</table>

**Picrolite, Schiller Asbestos.**—A Fibrous Serpentine, of an olive-green colour, containing asbestos in Serpentine. The fibres are long, fine, and brittle. It resembles some forms of asbestos, but differs in its difficult facility. Thomson's *Balkotine* belongs here.

**Marmolite.**—A Foliated Serpentine, of greenish-white and light green-shades of colour, and pearly lustre, consisting of thin folia rather easily separable. The folia are brittle, and the variety is thus distinguished from talc and brucite. It has the following composition—

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silica</td>
<td>40.1</td>
</tr>
<tr>
<td>Magnesia</td>
<td>41.0</td>
</tr>
<tr>
<td>Protioxide of Iron</td>
<td>27</td>
</tr>
<tr>
<td>Water</td>
<td>15.7</td>
</tr>
</tbody>
</table>

**Kerolite.**—Near Marmolite, but not separable.

**Serpentina** is a very handsome stone, when polished. Beautiful specimens from Cornwall, and other parts of England and Ireland, may be seen in the Museum of Economic Geology, London. When mixed with limestone it constitutes the Verd-Antique Marble. It does not wear well, although at first it receives a fine polish. Chalcedony iron is usually found disseminated through it. Dr. Jackson of America has shown that Epsom salts or sulphate of magnesia may be profitably manufactured from Serpentine.

**SERRATULA.** a genus of Compositae, Plants of the order Cynaraeae, and the section Serratulae. The heads of flowers are discoid by abortion; the involucres are imbricated, sharp, and unwedged; the scales of the receptacle split longitudinally into linear bristles; fruit compressed, not beaked; balsam areoles oblique; the pappus persistent. There is but one British species of this genus, S. tinctoria, the Saw-Wort. (Babington, *Manual of British Botany*)

**SERVIA or SERBIA,** a political division recently formed by decree of the emperor of Austria, consisting of portions of South Hungary and Slavonia. It is styled the Woidow- 
schaft of Servia and Tesembar Banat, and includes the Banat of Tesemvar (comprising the counties of Bac, Bodrog, Temez, and Kruse), to which several other words, the territories of the Bacza and the Banat), and the Syrmian districts of Unca and Ilok. The emperor is styled Grand-Woidowe, and the actual governor Vice-Woidowe, who resides by a ministerial commission and a native administrative council. The woido-
schaft is divided into 6 districts. It has an area of 11,538 square miles, drained by the Maros, the Temez, the Theiss, and the Danube. The population amounts to 1,426,211 Serbs, Wallachs, Germans, and Hungarians. [Croatia; Hungary; Tesemvar.]

**SERVITUDE, PENAL.** This punishment has come in
place of the former punishment by transportation, said to have
existed in the Roman law c. 358. a. C. The first Act
by Parliament on this subject is the 15 Car. ii. c. 3, 5, 8,
enabling the judge of assize to transport certain offenders to
America, there to remain and not to return.

§ 29 Car. ii. c. 5, 8, 4 gave the judges power, "at their discretion," to grant a reprieve, and to cause felons to be transported beyond the seas, there to remain for the space of seven years; but if the offender refused to be transported, or returned within the time, then he was to be put to execution. The 32 Car. ii. c. 5 directed a judgment of transportation in default of the felon elected to be transported, and it authorised the sheriffs to cause offenders to be embarked. It also made a return before the expiration of the sentence, a capital felony. The next statute is the 20 Car. ii. c. 11 "for the foundation of the law of transportation," which enacted that when the Crown should be pleased to extend mercy, upon condition of transportation to any part of America, any court, having proper authority to do so, might direct the offender to be transported "at large" in Great Britain, before the expiration of the term of transportation, liable, on conviction, to suffer death. The 8 Geo. iii. c. 16, extended the powers of the judges to make orders for transportation by enabling them to do so as judges of assize, by the sentence of death. And in c. 47, the king was empowered to authorise the governors of convict settlements to remit the sentences of transports.

By the 5 Geo. iv. c. 84 (amended by 11 Geo. iv. c. 1 and Will. iv. c. 30), consolidating the laws on the subject of transportation, enabling in some cases to remit the places beyond the seas, to which persons under sentence of transportation should be conveyed, the governor or other person to whom they were delivered, or his assignee, was authorised to substitute for their service any person of their own choosing. The title was also empowered by warrant to appoint places of confinement at home, either on land or on board vessels in the Thames, or other rivers or harbours, for the confinement of male offenders (recently extended by the 16 & 17 Vict. to females) under sentence of death, but reprieved or respited, or under sentence of transportation, to remain there under order of the secretary of state until entitled to their liberty, or removed, or otherwise dealt with. The capital punishment for offenders found guilty, was also abolished by the 5 Geo. iv. c. 67, which substituted transportation for life, with previous imprisonment not exceeding four years.

New South Wales, Van Diemen's Land, and Norfolk Island, thus became the principal receptacles for convicts. Although the property in the services of these persons was vested in the colonial governor or his assigns, a practice prevailed of granting them, in certain cases and on certain conditions, permission to employ them for their own benefit. These permissions were usually called "tickets of leave." By the 6 & 7 Vict. c. 7, the legislature, thinking it just, that ticket-of-leave convicts should be protected in their persons, and in the possession of such property as they might acquire by their industry, empowered them to hold personal property, and to maintain actions in respect thereof while such tickets remained unrevoked.

The reception of convicts having, however, become distasteful to the inhabitants of the colonies, the stat. 10 & 11 Vict. c. 67, was passed, permitting offenders under sentence of transportation to be removed to any prison or penitentiary in Great Britain; directors of the principal convict prisons being appointed afterwards under the 13 & 14 Vict. c. 39. The difficulty attending the reception by the colonies of transported convicts having increased, the stat. 16 & 17 Vict. c. 99, finally abolished the punishment of transportation for less than fourteen years, and substituted imprisonment and transportation for life, a system at home for a term of years giving the accused power in all cases to substitute such penal servitude for transportation.

Before this last statute was passed, a system had for some time prevailed with respect to well-conducted convicts (wh, although sentenced to transportation, had been kept in the expectation of granting them free pardons, generally at the expiration of half their sentence of transportation. As the continuance of the same system under the last-mentioned statute seemed likely to cause serious evils, it was at the same time desirable to encourage good behaviour in convicts, it was determined to try the experiment of retaining some control over them in cases where they were set at liberty before the expiration of their original sentence. With that view the 19 Geo. iv. c. 3, by order of the secretaries of state, to grant any convict a licence or ticket of leave, to be at large during such portion of his term of transportation or imprisonment, and upon such conditions, as may be thought fit, such licence being also revocable at pleasure.

Finally by the stat. 20 & 21 Vict. c. 3, the sentence of transportation is entirely abolished, and the sentence of penal servitude substituted; but the statutes which have reference to the transportation of convicted persons, whence reference to penal servitude, is that the name alone is changed.

**SEXUAL SYSTEM, in Botany, is the name given to the method by which Linneus arranged the Vegetable Kingdom. In this system plants are divided into twenty-five classes, each of which is divided into family, genera, and species. The following are the classes:
I. Flowers with Stamens and Pistils.

Class 1. Monandria; flowers with 1 stamen.
2. Diandria.
3. Triandria.
4. Tetrandria.
5. Pentandria.
6. Hexandria.
8. Octandria.
10. Dodecanandria.
13. Polyantha; 20 or more stamens inserted into the calyx.
14. Didynamia; 4 stamens; 2 long and 2 short. [Corigiara.]
15. Tetradynamia.
16. Monadelphia; flowers with the filaments of the stamens united in one set.
17. Diadelphia; flowers with the filaments of the stamens united in 2 sets. (In this class the flowers are placed on the receptacle.)
18. Polyadelphia; flowers with the filaments of the stamens united in 3 or more sets.
19. Syngenesia; flowers with the anthers of the stamens united.
20. Gymandra; flowers with the stamens and pistils combined. [Ochridiello.]
21. Monoeia; flowers with the stamens and pistils on the same individual.
22. Dioecia; flowers with the stamens and pistils on different individuals.
23. Polygama; flowers perfect and unisexual, on the same or on different individuals.

III. Fructification concealed.

24. Cryptogama.

It will at once be seen that this system is exceedingly artificial, and that the great object of arrangement and classification in natural history is not attained by it. The effort of the naturalist in all systems should be to bring together those objects which most resemble each other, and to separate those which differ. A classification like the above, which takes only one organ or part of an organized being as a means of arrangement, is therefore certain to frustrate the great aim of the systematist, to produce an evident and artificial classification such as the above can be tolerated is that of convenience in finding out the name of any particular object. It was undoubtedly this that led to the general adoption of the sexual system of Linnaeus by botanists. It is now however fast falling into disuse; and our catalogues of plants and annals of indigenous Floras are written on the plan of the Natural System. Linnaeus divided the above classes into orders in the same artificial way. The orders in the first thirteen classes were founded on the number of styles or stigmas in each flower. Thus, flowers having one style were placed in the order Monogyna, those with two in the order Digyna, those with three in Trigyna, and so on. Thus the names of the orders are repeated in each of the thirteen classes. In the remaining classes however, points of structure are adopted. In Didynamia the orders are two, according as the fruit is 4-lobed or caparisan. The first order is called Gymnogyna, and the second Angio sperma. These names were given by Linnaeus under the erroneous supposition that the 4-lobed ovaries were as series of naked seeds.

The class Tetradynamia was divided into two orders, according to the form of the fruit, Siliculose embracing the species with the fruit a silice, and Silicinos those with a silice.

In the classes Monadelphia, Diadelphia, and Polyadelphia, the number of the stamens was made the text of the orders, and these were named as the classes. Thus we have the order Decandra, class Monadelphia, and the order Decandra, class Diadelphia.

With regard to Syngenesia the following plan will afford the best idea of the nature of the orders:

Order 1. Polygama Equalis.—Flowers all hermaphrodites.

Order 2. Polygama Superfusa.—Flowers of the disc hermaphrodite, those of the ray pistilliferous and fertile.

Order 3. Polygama Frustanae.—Flowers of the disc hermaphrodite, those of the ray staminiferous.

Order 4. Polygama Frenesia.—Flowers of the disc staminiferous, those of the ray pistilliferous.

Order 5. Polygama Segmenta.—Each floret having a separate involucre.

Order 6. Monogama.—Anthers united, flowers not compound.

This large class thus divided by Linnaeus forms the natural order Compositae, and has been recently subdivided in a much less artificial manner than in the orders above given. [Courvois.] The class Gymandra was divided into orders by the number of the stamens. It includes the natural orders Orchidaceae and Aristolochiacae.

The classes Monoeia and Dioecia are also formed into orders according to the number of stamens, and the orders are again named as preceding classes. Thus we have order Diandria, class Dioecia, etc.

The class Polygama has the following orders:

Order 1.—Monocarp.—Hermaphrodite, staminiferous, and pistilliferous flowers on the same plant.

Order 2. Dioecian.—Flowers on two plants.

Order 3. Triocarpia.—Flowers on three plants.

The Cryptogama were divided into the orders:

Filiaca.
Ferns.
Musei.
Mosses.
Hepaticae.
Liverwortz.
Lichenes.
Algae.
Sea-Weeds.
Fungi.
Mushrooms.

For the arrangement of the vegetable kingdom, according to the Natural System, see the articles Exoeae and Enoeae.

SESSIONS. The statutes 18 & 19 Vict., c. 45, has amended the procedure in Courts of Quarter Sessions, by prescribing uniformity of time for giving notices of appeal; by conferring extensive powers of amendment; a large discretion as to costs; and by enabling them to refer matters to arbitration. By the statutes 11 & 13 Vict., c. 75, these Courts, in common with the Courts of Oyer and Terminer and Gaol Delivery, are empowered to reserve questions of law for the consideration of the Court of Criminal Appeal; and by the statute 12 & 13 Vict., c. 46, the powers previously given to Judges to order payments by way of reward for the apprehension of certain offenders was extended to these Courts, the compensation to one person in no case to exceed $5. The statute 12 & 13 Vict., c. 16, makes further provision for the holding of petty sessions in criminal matters, and declares that every sitting and acting of justices, or of a stipendiary magistrate for a city or borough, having a separate commission of the peace, shall be deemed a petty session. The fees of justices, their charges, &c., are fixed by the statutes for by the 11 & 12 Vict., c. 43, and 14 & 16 Vict., c. 56. See further Juvenile Offenders, S. 2; Justices of the Peace, S. 2.

SEYBENITE. [Mineralogy, S.1.]

SHAKESPEARE. [Mineralogy, S.1.]

SHAKHOFSKY, PRINCE ALEXANDER ALEXANDROVICH, a prolific and popular Russian dramatic author, was born in 1777, at a village in the government of Smolensk. He entered the army in 1792, but in 1801 obtained the more congenial appointment of one of the directors of the theatre. The war of 1812 recalled him to the army and to the command of a regiment of Cossacks, but after its conclusion he resumed the duties of management. He retired with a pension in 1816, and died in 1846. During his lifetime Prince Shakhoovsky was the most conspicuous of Russian dramatic authors, and his plays were among the most fashionable in the theatres at St. Petersburg and Moscow. He achieved his greatest originality and his most successful efforts. SHAP. [Westmorland.]
SHARPE, DANIEL, F.R.S., at the time of his decease president of the Geological Society, was born in London in 1806. His father who died a few weeks after his birth, was sister to Samuel Rogers the poet. He was educated at Walthamstow, and as a boy early showed a taste for the study of natural history, but he did not commence serious researches until he had been admitted a Fellow of the Geological Society in June, 1829. In that year he gave his first memoir to the society, on a new species of Ichthyosaurus, I. grampius, which, however, it afterwards appeared had previously been described by Cuvier. The subject, however, was a new one to Mr. Sharpe, and it was an open question to the Geological Society a series of memoirs on the rocks of the neighbourhood of Lisbon and Oporto. The first is a mere sketch of the general arrangement of the tertiary and secondary rocks by a young and intelligent geologist; the second, on the same subject, is fuller and more definite, but not sufficiently complete in the determination of fossils to fix the precise age of the strata described. It contains, however, in an appendix, some observations of great value on the 'cylinders' of Lisbon, and on the general Proceedings of the Geological Society for 1836, on which the present paper is founded, but with omissions, alterations, and additions, the following just remarks occur on this subject:—"In the present state of knowledge regarding that country, it is impossible to deny that this may be the case, but it must be remembered that the few remains of plants discovered in these strata are considered by palaeontologists to present characters indicative of 'carbiferous' age; and even those geologists who most strenuously support the so-called uniformitarian doctrines, incline to attribute the peculiar position of the coal to one of those great inversions of the strata so frequent in highly disturbed districts of all ages, from paleozoic up to tertiary time." The fourth paper commences with a succinct sketch of the general geology of Portugal, and goes on to define the limits of the secondary rocks north of the Tagus, both by stratigraphical and palaeontological evidence. Long before this paper was read, Mr. Sharpe had acquired, much original skill and knowledge as a palaeontologist, and on palaeontological principles he now established the existence of cretaceous and Jurassic rocks in the country described. The whole formed an excellent sketch of a hitherto undescribed country, and up to this date British geologists are chiefly indebted to these memoirs for the knowledge they possess of a land where the science is almost uncultivated.

Between the years 1842 and 1844 Mr. Sharpe gave to the Geological Society, on the Silurian and Old Red-sandstone rocks of Wales and the north of England, territories previously chiefly illustrated by the labours of Professor Sedgwick. The first of these is 'On the Geology of the South of Wexfordshire.' Part of this paper describes the ranges of the Comiston limestone. Mr. Sharpe identified it by its fossils forming part of the Lower Silurian series, but did not determine its actual horizon. In 1839 Mr. James Garth Marshall, F.G.S., in a paper read before the British Association, placed it on the parallel of the Cambrian series, and said "it is impossible to separate by their fossils, the Bala rocks were the equivalents of the Llandeilo flag and Caradoc sandstone. This sagacious determination has since been confirmed by Mr. J. W. Salter, F.G.S., as regards the Caradoc sandstone, the fossils of Bala rocks have also been found in the sandstone of Sir Roderick Murchison in Shropshire being the same.

The more elaborate paper of 1844 is accompanied by a geological map of North Wales, and has been considered as showing the results of a new palaeontological determination of the age of rocks, and, in this case, at least, the time he allowed himself to map North Wales was too short for the satisfactory elucidation of the problems he proposed to solve.

Pursuing at intervals these subjects, Mr. Sharpe produced in 1847 an elaborate analysis and comparison of the Silurian fossils of North America, collected by Sir Charles Lyell, with those of Great Britain, and confirmed the views of the two countries. In a paper read before the Geological Society Mr. Hall, that the American Silurian strata, like the British, consist of two great divisions, namely, upper and lower.

While engaged in these investigations, Mr. Sharpe's attention was drawn to the subject of the slaty cleavage and associated phenomena, and he determined to give a full account of the Red-sandstones, the North of England, the Highlands of Scotland, and Mont Blanc. In 1844, 1845, 1852, and 1854, he produced four memoirs on these subjects, the two first and the last of which he published in the 'Quarterly Journal' of the Geological Society and the 'Transactions' of the Royal Society. These questions had previously been made the subject of special investigation by Professor Sedgwick, Mr. Darwin, and Professor Phillips. It has been said that the knowledge of slaty cleavage at that date Mr. Sharpe generalized too largely; and though this may be the case, an attentive perusal of the memoir of 1846 proves that in some important points he materially advanced the subject at that date in the direction to which the labours of Mr. H. G. Sorby, F.G.S., have since tended. He attributes the cleavage of rocks, and consequent distortion of fossils, to pressure perpendicular to the planes of cleavage, and asserts that rocks are expanded along the cleavage planes in the direction of the dip of the strata. In the communications of 1845, the doctrine that pressure is the cause of cleavage is still more distinctly insisted on, and remarkable instances are given, in which pebbles were observed which appeared to have been compressed and elongated in the planes of cleavage of the rocks in which they occurred. The doctrine is illustrated by Dr. Sorby, in the 'New Edinburgh Philosophical Journal,' that the fine particles composing the slaty rocks are arranged lengthwise in the direction of the cleavage planes. Deep-seated faults, in which the passage from one bed to another, to beds of different lithological character offering different degrees of resistance to pressure. The idea that cleavage may be due to crystallization action is altogether repudiated. It must be admitted, however, that no adequate investigation has yet been instituted of the relations of crystallization to the greater structures of rocks. We are as yet uninformed whether there are or are not jointed structures on the great scale, resulting from the coincidence of crystallization planes in comparatively large areas, as some of the phenomena exhibited by the Jewish mountains and by certain serpentines, tend to indicate. The two last of the series of Mr. Sharpe's papers on these subjects, published in 1850 and 1854, describe respectively the cleaved and foliated rocks of Scotland and France, and the author has chiefly devoted to the development of his theory of the great 'cylinders' or arches, in which he asserted that the laminae of cleaved and foliated rocks lie. In these memoirs he made no advance beyond his previous ideas, for he attributed the phenomena of cleavage and foliation to the same causes as he had before denied. However, though he indicated the fact, he gave no explanation of the reason of the occurrence of planes of cleavage and foliation in arched lines, a subject that has since been acutely and ably discussed. The author, in his latter paper, seems not far distant. In the paper on Mont Blanc he remarks that Mr. Sharpe explains and corrects for the first time, we believe, the remarkable error of Samurac, in representing the
cavage of slate, wherever they occur in the Alps, almost invariably as stratification; having mistaken the planes of cleavage for those of bedding, and regarded the latter as a series of parallel joints. But while showing that this systematic error runs throughout the whole of Sauvage's volume, he shows also that Sauvage's observations, even when his conclusions are erroneous, are always accurate and instructive. He was led into the error from observing the analogy between the foliation of the schists and the cleavage of the slate, and he was convinced of the correctness of his definition of cleavage for many years afterwards. Mr. Sharpe points out "after correctly distinguishing cleavage planes and foliation, Mr. Sauvage has been led to class the foliation of crystalline rocks with the latter instead of the former; thus proposing to unite two phenomena of totally different origin, while they separated those which are really analogous, and probably due to one and the same cause."

Besides these memoirs Mr. Sharpe contributed to the Geological Society various papers on special subjects, "On the Quartz Rocks of Macculloch's Map of Scotland," "On the Southern Borders of the Highlands of Scotland," and various paleontological communications; "On the genus Truncatia," the "Abandonment of marlstone purpurine, and the Cretaceous beds of Portugal," "On the genus Nerinea," and a note on the fossils of Boullonnais, appended to a paper by Mr. Godwin Austen on that district. He also furnished several parts of the Zoological Society's scheme of the Palaeontological Society. "On the Fossil Remains of the Moluscus found in the Chalk Formation of England," and on this important work he was still engaged when he met with the accident that caused his untimely death.

Mr. Sharpe was a man highly endowed with the gifts of a poet, with the powers of an artist, with the force of a man, and with the knowledge of a scholar. His life was full of activity and usefulness. Besides his natural powers, his habits of continuous study, the necessities of the times, his peculiar health, the prejudice against his religious opinions, all combined to make him a contributor to science.

Anxious however to acquire a wider reputation, he, in 1788, came to London. Here he found in Edmund Burke a kind friend and adviser. Burke introduced him to Sir John Reynolds, who treated him with much cordiality. Mr. Shee recommended him to the President of the Royal Academy, who became for the first time a contributor to the exhibition, sending a 'Portrait of a Gentleman,' and a 'Head of an Old Man.' Though he did not become a popular portrait-painter, he was far from unsuccessful; for some time at least, obtain many sitters from among the aristocracy or nobility of the land, and steadily into a good and tolerably lucrative practice, towards which his geniality of manners rendered him valuable service. In 1798 he was elected an Associate of the Royal Academy, and he now deemed his position sufficiently secure to venture on taking the house in Cavendish-square, which Romney (whose successor he aspired to become) had built for himself when in the height of his celebrity. In this house Shee continued to reside until failing health compelled him to make some alteration in his dress and remove to a country seat, which he held for a century later. This change of residence was attended with an improvement in his professional standing. He had painted a good many portraits of the leading actors, and of the leading politicians in the last generation of great politicians, which had attracted attention at the exhibitions, and rendered him the object of some attention. Shee's next move was to his fashionable house. That he was fast making his way was sufficiently shown by his election as Academician in 1806, only two years after his election as Associate: his presentation paper was "On the formation and relations of the Bench." From this time his career was marked by few changes or vicissitudes. Like most of the English painters of the time, during the short life in the war between France and England he went to Paris to examine the art-treasures which Bonaparte had collected in the Louvre and elsewhere. The biographers find little to notice until he appeared before the public in the character of a poet, by the publication, in 1805, of his 'Rhymes on Art, or the Remonstrances of a Painter,' a work which his author described as "a poem on painting, in which, more particularly, the early progress of the student is attempted to be illustrated and encouraged." A second part of it appeared in 1809. Byron praised the poem, and it was a good deal read and quoted at the time; and painters still occasionally garnish their literary essays with a stanza from it; but its vitality has long since departed, though it has an easy flow of rhyme, and is not without more substantial merit, and the notes are occasionally valuable. Again, on the occasion of the exhibition in 1821, Mr. Shee exhibited at the British Institution, and a 'commemoration dinner' in honour of Sir Joshua being given by the directors of the institution in May 1803, at Will's Rooms, the prince regent presiding—Mr. Shee invoked the interest of his friends, and fell in a notice, now entitled 'The Commemoration of Sir Joshua Reynolds, and other Poems.' His next appearance as an author was under, to himself, mere exciting circumstances. He had written a tragedy called 'Alasco,' the principal character of which he deemed to be particularly suited to the historical powers of his friend Kemble; who agreed to act it. But it happened to be the first tragedy which fell under the hands of Colman, the new licensor of plays, and he regarded himself as being perhaps too young and inexperienced to act the moral purity of the play-going public, and was not permitted to permit it to be performed so long as it contained certain bits of declamation about liberty, and denunciations of despotism, as well as one or two expressive lines. To the expulsion of these the author resented the right to have his tragedy referred to the Lord Chamberlain himself against the decision of his deputy. But the chamberlain (the Duke of Montrose) declining to examine that on which his deputy had "reported," replied, with the observation of grammar, 'I do conclude, that at this time, without going to personal discussions, the tragedy should not be acted.' Shee however was not to be silenced, and resolved to shame his censors by printing his tragedy, though it was not allowed to be performed. It was printed in a secret manner in which the facts were set forth with considerable warmth, while all the prohibited passages were printed in italics. The tragedy itself is forgotten now, but it will be referred to by writers of literary and political history for illustrations.
of what was prohibited as politically dangerous in London so late as 1825. The censor certainly did his work carefully. Treason is seen to lurk sometimes in single words—often in single lines, such as—

"Or question the high privileges of oppression."

Even the mention of—

"Some slanderous tailor of state, some looting, full, unwise man's deputy,"

is thought to bode mischief, and is expunged accordingly. This was Shee's later appearance as a poet, but once later he tried his hand as a novelist.

Literature however was but his amusement. During all these years he had been steadily making his way to a fore-

men position in the fashionable world of the times of the day. The mantle of Reynolds had not fallen on his suc-

cessor, but Lawrence's easy gracefulness of style concealed his deficiencies from the eyes of his contemporaries, and he reigned in undisputed supremacy. But Lawrence could not alone supply the demands of the titled and wealthy claimants for the immortality of portraiture; and though among the political and literary celebrities Phillips perhaps was most in repute, his gay colour and polished manners undoubtedly rendered Shee second favourite with lords and ladies.

On the death of Lawrence in 1830, he naturally aspired there-

to succeed him not only as a fashionable portrait painter, but also as president of the Royal Academy. Wilkie became his opponent, but though of course there could be no com-

petition between their respective powers of the two men, the academicians felt that Shee's fineness of speech and courtly address were of far more consequence in the academic chair than more eminent artistic abilities with reserved manners and a faltering tongue. Shee was elected president by a large majority, and soon afterwards received the honour of knighthood. He is said to have filled all the duties of his office with zeal and ability, and his official eloquence on those public occasions which it called forth was much admired. He continued to paint until 1846, in which year he exhibited for the last five time pictures; but his powers had been for some years evidently failing. He now, on the ground of inability to discharge its duties, resigned the presidency, but at the unanimous request of the academicians he was induced to withdraw his resignation, and he continued to hold the office till his death, which occurred on the 13th of August 1850, in his eightieth year.

Sir Martin Archer Shee will not rank among the great portrait painters of the English school. He is deficient in depth and force, in intellectual expression and in character-

isation. But his colour is often pleasing though too florid, and his figures have an air of ease and refinement; and his pencil has undoubtedly preserved the best portraits of many of the most distinguished contemporaries. He occasionally painted historical figures and fancy subjects, but none of them won much attention. He was an accomplished gentle-

man rather than a great painter.

H.C. W. RICHARD, M.A., F.R.S., F.R.A.S., was born at Leeds, July 30th, 1794. His father was engaged in the cloth manufacture, and destined his son for the same pursuit. At the age of fifteen however, and after an ordinary school education, the son discovered his own preference for a learned profession, and the father accordingly placed him under the care of the Rev. James Tate, M.A., the master of the Grammar-school of Richmond in Yorkshire, well known as one of the most successful teachers of this science in the country as an elementary case. He remained until 1812, when he was removed to Trinity College, Cambridge. He took his degree with honours in 1816, obtained a fellowship in the next year, and proceeded to study for the bar, to which he was called about 1822. A weakness of sight, to which he was always subject, is sup-

posed to have been the principal cause of his not practising law; but it must be added that his share of his father's property placed him in easy circumstances, independently of his own, and his anxiety for science had become very decided. He took orders about 1824, and devoted himself entirely to astronomy. He became a fellow of the Royal Astronomical Society in 1824, and was elected into the Royal Society on the 1st of April 1830. Of the followers of the second generation of the activative body. His leisure, and his desire to help the young astronomer so long as he wanted advice and guidance, gave a peculiar value to his services, and a peculiar utility to his career.

Mr. Sheepshanks resided in London till about 1843, when he removed to Reading, where he died of apoplexy, April 4th, 1855. There is much reason to suppose that his life was shortened by his labours exertions in the restoration of the standard scale of linear measure. Though an ardent advocate of the opinion which held for existence during the first half of his life, but gradually became victorious in the second, he never took any public part in a political question, except that of the Reform Bill. He was the first to propose a boundary line to fix the boundaries of the boroughs under the new system of representation. His reading in politics and history is stated to have been extensive; and he was espe-

cially partial to military matters, with which he was very well acquainted. He exhibited in the British Museum a portion, and no inconsiderable portion, of his studies. To this must be added literature and poetry, to which he was much attached. He never abandoned classical reading, and those who knew him best were often surprised at the extent to which he had cultivated modern literature.

But his subject was astronomy, and his especial part of that subject was the ~astronomical instrument. His reputa-

tion among astronomers on this point, and the articles by which he contributed to the ~enny Cyclopedia, have

induced an expression of regret that he did not draw up a full treatise on a matter which he had so completely fatihmed.

Mr. Sheepshanks was engaged in active efforts on several special occasions, to which we make brief allusion. In 1828 he joined Mr. Airy, now Astronomer-royal, in the pendulum operations in Cornwall, and suggested some of the most important corrections to the operation of pendulums that are active in the establishment of the Cambridge Observatory. In 1833 he was consulted on the part of the admiralty with reference to the edition then preparing of Groomebridge's Circumpolar Catalogue: the remit was the publication of a work that would be of much more value than it would otherwise have appeared in. In 1832 he also interfered in a matter to which, connected as it is with personal differences, we can only here allude, as eliciting much information on the subject of equatorial instruments in general, a remit which is entirely due to the part taken by Mr. Sheepshanks. In 1838 he was engaged in the chro-

nometric determination of the longitudes of Antwerp and Brussels; and in 1844 in those of Valetta and Kingstown in Ireland, and Liverpool. In 1843 a subject of the Liverpool Observatory led him into a controversy, his pamphlets on which will be useful study to those who are interested in astronomical instruments. He was always in active member of the Board of Visitors of the Royal Ob-

contended in defence of truth and justice, as they appeared to his mind.


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.. SHEL

RICHARD LALOR, the son of Mr. Edward Sheil, a merchant of Cadiz, was born in Dublin in the year 1793. His father was a Roman Catholic, and he was educated in that religion at the Jesuit College of Stonyhurst, Lancashire. He became ill of his lungs when he was an undergraduate of the Trinity College, Dublin, where he graduated with distinction. He next proceeded to London, and entered himself at Lincoln's Inn to study for the English bar, which he had been recommended to. The late T. Campbell, a great advocate, had a high opinion of his father's means through a dispassionate character. It is said that he induced his father to change his residence and return to Ireland, where he was called to the bar in 1814. He destroyed the expenses of his years of study by the successful tragedy of 'Adelaisa,' in which Miss O'Neill performed, and by those of the 'Apologies,' 'Bellamiris,' 'Evadne,' and 'The Huguenot.'

At this time he also contributed some 'Sketches of the Irish Bar' to the 'New Monthly Magazine,' then edited by Mr. T. Campbell. It appears he was a very promising young man, and a speaker, he never heartily devoted himself to a deep study of so dry a subject as the law, and that his professional income in consequence was not large. He was not a lawyer but an orator by nature, and he found his forte in the literary stage for the display of his talents than the law courts of Dublin. As a Roman Catholic too he laboured under the civil disabilities which, though modified from what they had been, still shut the doors of the House of Commons against him, and his religious principles induced him to take an active part in all of them. It was, however, against the bill introduced for its suppression. The bill however passed; but it only served to inflame his religious zeal and to rouse his oratorical powers to such a pitch of vehemence invective against the government, that a prosecution was commenced against him for seditious language. The illness of Lord Liverpool however transferred the premiership to the hands of Mr. Canning, who wisely ordered the prosecution to be abandoned. In 1829 Mr. Sheil took an active part in procuring the return of Mr. O'Connell to parliament, as member for the county of Clare, and also addressed the great meeting held at Penenden Heath for the purpose of resisting the Roman Catholic Emancipation Bill. In 1839, soon after the passing of the Relief Act, Mr. Sheil was returned to parliament for the county of Milborne Port, by the influence of the late Marquis of Anglesea, who, while holding the lord lieutenantcy of Ireland, had noticed his career, and who thus turned the restless agitator into a peaceful citizen and a useful magistrate. His oratorical powers were appreciated, and he soon became one of the most popular and active speakers in the House of Commons, though the matter of his speeches never rose to a level with the brilliancy of illustration and force of impassioned declamation with which they were adorned. In 1830 he was again returned for Milborne Port, and in 1831 for the county of Louth. After the passing of the Reform Act, which gave much dissatisfaction in Ireland, Mr. O'Connell commenced agitating for repeal, in which Mr. Sheil at first ran the least risk, as his biographer, Mr. T. M'Cullagh, asserts, that it was "in point of fact but short-hand for just and equal government in Ireland." In December 1832 for the first reformed parliament he was chosen to represent the county of Tipperary, where he had acquired some extensive landed influence by his second marriage with the widow of Mr. E. Power of Gurteen, on which occasion he adopted that lady's maiden name of Lalor. In 1834 the Grey ministry introduced an Irish bill, which caused a great deal of excitement among the Irish members, among whom was Mr. Sheil, but a report came from the house that several of them had expressed a wish that it should be carried, "or there would be no living in Ireland," an expression which Mr. Sheil and on Lord Althorp being appealed to, he replied that he had no personal knowledge of any such expression, but had heard it, and though he could not give up the names, he would tell any member who asked whether he was one. On

Mr. Sheil making the inquiry, he replied he was one who had been mentioned. Mr. Sheil denied it at once: a parliamentary committee was appointed, and Mr. E. Hill, who appeared before the committee to support the allegation, confessed that he believed that he had been misinformed. In the same year, which was a period of great agitation, he was a signatory to the Compact, a term applied from a phrase of his own, in which he hoped "that no minor differences would mar their compact and cordial alliance." In 1838 he was offered office by the Melbourne administration; at first the clerkship of the privy council, and then, it was reported, he became one of the commissioners of Greenwich Hospital, and never again advocated repeal. In 1839 he was made vice-president of the Board of Trade; and was also sworn a member of the privy council. He read the bill for the establishment of the post office on whom that honour had been conferred since the reign of James II. In June 1841 he was appointed judge-advocate-general, when he resigned the seat for Tipperary for that of the borough of Dungarvan; but he held office only till the following September, when his party were superseded in office by the late Sir Robert Peel. On the advent of Lord John Russell to power in 1846, Mr. Sheil was appointed to the mastership of the Mint, which he filled until November 1850, when he was sent as agent of the British minister at the court of Tuscany. His health had been broken down for some time, and he had rarely spoken in the House of Commons for the two or three years immediately preceding his retirement from parliamentary life. Although the appointment to Florence was one of the most important in his life, he regarded it as nothing less than expiration and an extinction of what might have been a growing reputation, yet he submitted not so much with a feeling of philosophic indifference as in a joyous spirit, as though he felt that his diplomatic post would prove a great Traveller's Shiel, by W. T. M'Cullagh.)

SHELBURNE. [Novo Scotia.]

SHELLEY, MARY WOLLSTONECRAFT, daughter of William Godwin and wife of Percy Bysshe Shelley, was born in 1792. In 1816, while in Italy, she wrote her powerful and striking romance of 'Frankenstein,' which commanded an extensive popularity in England, and is still a favourite with the admirers of the wild and wonderful, while the extremely ingenious and consistent development of the character of the monster combines with the monster even the most fanatical regard for the theory of the book. Though Shelley was a prolific writer, she was not a workman, and the elegance of her style was not always removed by the book. She was a student, and the health of the publisher with affectionate solicitude, which she gratefully acknowledged and repaid. Just previous to his unfortunate death however she had finished 'Valperga,' a novel, afterwards printed in 3 vols., for which Shelley says in one of his last letters that she had been offered 400l., which he designed for the relief of the necessities of his father-in-law, W. Godwin. After her husband's death she published 'Falkland,' 'The Last Man,' and 'The Fortunes of Perkin Warbeck,' each in three volumes. She also wrote a 'History of Rambles in Germany and Italy,' an account of her journeys with her husband. In 1829 after the publication of his poetical works, with a few biographical notes added, in which the more offensive passages of 'Queen Mab' are omitted; and in 1840 a selection from his letters and a few specimens of his prose writings. In all these, to which a few poetic, but no section devote to his goodness of heart and the other amiable qualities which she states invariably secured him the love of all who knew him. She died in London, on the 1st of Feb-

SHEDD. [Mineralogy, S.1.]

SHERBROOKE. [Canada, S.2.]

SHIPPING. [Trade, Shipping, &c, &c.]

SHIPS. Nearly all the statutes mentioned under this head (Sails, v. 17, c. 150, and Vic. C. 150). The law relating to shipping, to the contracts arising from the employment of ships, and to the mutual duties and obligations of masters, masters, passengers, and seamen, remains, nevertheless, almost unaffected; the pro-
visions of the repealed statutes being, in principle, though not always in detail, re-enacted by the statutes about to be mentioned.

The most important of these is the Merchant Shipping Act, 1862, which is amended by stat. 16 & 19 Vict. c. 91; in the next importance, the Passengers' Act, 186 & 19 Vict. c. 119. The Act relating to bills of lading, and that concerning admiralty jurisdiction on the County Courts, have been almost entirely transferred to [Landau, Binn or; &c., County Courts (S, C,)]. It would be quite impracticable to give any detail of the provisions of these Acts, which constitute complete codes in themselves, and which must be referred to by every one who wishes to know anything of the subject.

It is necessary to mention here, however, the statutes which have repealed the Navigation Acts, whereby, it was said, "the constant increase of English shipping and seamen was not only encouraged, but rendered inavoidably necessary.

These Acts were by various statutes maintained down to a recent period; their leading feature being to secure the exclusive trading by which it was thought British shipping and navigation were encouraged. The first step in favour of free trade was effected by the statute 12 & 13 Vict. c. 29, by which the exclusive privileges of British ships were limited in effect to the coasting trade of the United Kingdom, the trade with the Isle of Man and Channel Islands, and the coasting trade of the colonies. But this Act has been almost entirely repealed by the statute 16 & 19 Vict. c. 107, by which the entire trade has been thrown open to vessels of all nations.

The Board of Trade exercises a general supervision over all matters relating to merchant ships and seamen, and the carrying into execution the statutes in force relating to the protection of seamen, regulations governing the registers of Merchant Seamen, as to trade and navigation, and originates inquiries and considers reports made to it by its inspectors and other officers.

It exercises a partial control over local marine boards, and may lay down rules as to the conduct of examinations, and the qualification of applicants for the posts of masters of masters and mates of passengers' ships. It grants licences to persons to engage or supply seamen or apprentices for merchant ships; adjudicates on claims for seamen's wages, investigates cases of alleged wanton and reckless neglect in master mariners and appointees officers to report on the condition and efficiency of steam-vessels and their machinery. These and its other duties, and the mode in which they are exercised, are defined in the Merchant Shipping Act, and other statutes above referred to.

SHIPSTON ON STOUR. [Worcestershire.] SHIPWRECKS AND LIFE-BOATS.

That wrecks are numerous, is a fact well-known to a seafaring nation like ours, and where the coast-line is so nearly bare, regard being had to the perils of the deep, will of course be admitted; but that nothing can be done to lessen their frequency, would be a hopeless theory of which we ought to be ashamed. Supposing for the sake of fixing the idea, that we have or may one day have, a vessel of the most modern and powerful principle, and that a knowledge of winds, waves, currents, whirlpools, shoals, reefs, and sunken rocks, on the part of meteorologists and hydrographers; that others are caused by the incompetency of captains and mates; that others again result from the insubordination, carelessness, ignorance, or obstinate hatred of seamen; that a fourth group are due to the deficiency of lighthouses, beacons, and buoys; and that the remainder arise from want of ready assistance to ships which, though placed in the track of possible disaster, have not the means of science at command; knowledge of winds, waves, currents, whirlpools, shoals, reefs, and sunken rocks, on the part of meteorologists and hydrographers; that others are caused by the incompetency of captains and mates; that others again result from the insubordination, carelessness, ignorance, or obstinate hatred of seamen; that a fourth group are due to the deficiency of lighthouses, beacons, and buoys; and that the remainder arise from want of ready assistance to ships which, though placed in the track of possible disaster, have not the means of science at command.

A dismal story, indeed, does the "Wreck-chart of the British Islands" tell, as published by the Admiralty, and afterwards in the Life-Boat Journal. It may be designated a truly distressing map. Every wreck on our coasts has its little black mark; and the aggregate of such black marks reveals the extent and magnitude of the wreck. And that black spot indicates a vessel wrecked, and that + indicates a vessel so seriously damaged as to need to discharge cargo, we look eagerly for the relative numbers of these latter cases as an index. It is saddening to see how numerous are the fatal black marks, and how the black spots are numerous because the coast is dangerous; at others, because the congregating of ships is very great.

And if it be asked, "What ratio did 1857 bear to previous years, in respect to these calamities?" it is encouraging to know that on the whole it was favourable, fewer lives were lost and more were saved, than usual; yet still our coasts saw not fewer than 1143 wrecks of ships. The lives lost numbered 638 (in 1854 they amounted to 1460), and the number of lost vessels was 1866, of which 982 were by life-boats, 612 by loggers, coast-guard boats, &c., 507 by assistance from shore with ropes, mortar-apparatus, &c., 948 by ships' own boats, and steam-vessels, and 8 by individual exertion. It is, however, a matter of regret to see that 22 vessels, members, happened on our own coasts—on the coasts of the most busy maritime islands in the world; where, if there be liability of disaster through the vast congregation of shipping, there ought, on the other hand, to be a corresponding improvement, in some degree, of search and human assistance. In examining the details of the chart, it will be seen, that, as usual, the line of coast between Dungeness and the Pentland Firth is the most fatal, and that the mouth of the Tyne takes the unenvied precedence of all other places, in the number of black dots and stars opposite to its name; next come the month of the Tens and the month of the Wear. These three rivers may be taken as the representatives of the district wherein three million tons of vessels are brought by sea to London yearly, excepting the services of several thousand collier ships, which sail to and fro, and add to the otherwise busy commercial trade of the Northumbrian and Durham ports. The mouth of the Humber, the Suffolk coast between Yarmouth and Southwold, and the coast of the South or Scilly Islands, will also be noted, for the movements of the Goodwin Sands, the Scilly Islands, Barnstable Bay, and Liverpool, are the portions of the English coast which present, in the next degree, the most numerous indications of ship-losers. The Welsh coast is thickly shrouded, especially in midsummer, from the Llyn Peninsula to the Mersey, and near the Firth of Forth, presents no large numbers; the western coast is, indeed, remarkably free, due probably to the less exposure to the winds which tend to drive ships upon our eastern seaboard, and Ireland present a tolerably equable distribution along the east and south coasts: less on the northern and western.

The annual report states that the year 1857 was a favour- able one with respect to shipwrecks, yet 437 vessels were totally lost, and 706 damaged. Of these, 500 vessels were of British ships; 33 were registered in British colonies; 213 were foreign vessels; and 72 were not known; the total amount of the tonnage of these ships was 218,570, and they were manned by 9019 sailors. Of the total wrecks, 63 were by collision, owing, in many cases, to the report of navigable, and the remains of a ship on the beach, or on the rocks, suggest the previous existence of a wreck, which, if recorded, might be of some use in the formation of a Statistical Society of the United Kingdom, where wrecks and near sinking-vessels can be the subject of inquiry, and the means of searching for survivors should they be lost.

Many enquiries into the causes of shipwreck have been instituted; and especially one by a Committee of the House of Commons, whose voluminous report resulted. But public attention was perhaps more fully drawn to the subject by the Duke of Northumberland, who, in 1850, offered a premium of 1000l. to the party who should suggest any means of preventing ships from being lost. This was successful, and has continued ever since. In the earlier part of this century, before the establishment of life-boats, it was suggested by a number of persons to induce the formation of Local Committees at the chief

* The Life-Boat; or, Journal of the Shipwreck Institution. Established by C. Knight, 60, Fleet-street; and to be had at the offices of the Lancashire, 14, John-street, Adelphi.
ports for a similar purpose; to maintain a correspondence, beneficial to all parties, with these Local Committees; to reward persons who render assistance to distressed ships or mariners; and to encourage the invention of new or improved boats, buoys, balls, rocket apparatus, and other means for saving life. The Society commenced a little work, in Numbers at twopenny each, which, at intervals, gives an epitome of all that is worth knowing on this matter.

A deserved meed of praise was given by a Quarterly reviewer of the "Life-Boat Institution," in that he has established, at his own cost, at the principal stations off the coast of his native county, "life-boats of an improved construction, and supplied with all the necessary apparatus and appliances, that may contribute most efficaciously in assisting, favourably in stimulating the humanity and activity of the neighbouring population, and from which the tourist, without being unseasonably sentimental, may derive his full share of satisfaction. The grave-yards which surround the stirring ruins and picturesque churches of mountainsous Northumberland, are full of the mournful records of youth cut off in its bloom, and manhood in its prime, by the tempestuous waves. Each stone has its own sad tale—of brothers found locked in each other's embrasures—a father who perished in a vessel abandoned by the perils of fate, united to his industry and affection, and undivided in death, swallowed up in the little craft that constituted the whole of their worldly wealth. He must be 'duller than Lethe's dull weed,' whose heart he could not read, the victim of as many struggles and their fate, and whose eye does not glinten when he hears of the ménongence which has done all that on that dangerous coast can be done to avert such catastrophes in future."—Quarterly Review, No. 194.

It is too much, however, has been said. This is to put a limit to man's ingenuity and foresight, which we should be sorry to admit until the desired end has been more fully attained.

An example—neither of the means for preventing shipwrecks, or for saving the lives of those who may be endangered by wreck—but for rendering aid to the poor fellows who may have lost all but life by such calamities, the "Shipwrecked Fishermen and Mariners' Royal Benevolent Society" deserves a word of notice. The scheme was formed at Bath in 1839 by Mr. Rye, who was impressed with the importance of affording relief to the widows and orphans of fishermen and mariners who might be drowned, and of assisting with clothes, food, and money, those who might be cast ashore destitute, but destitute at once of all the necessary of life. Aided by Sir Jahleel Brenton, at that time Governor of Greenwich Hospital, Mr. Rye succeeded in establishing a society, and in collecting a respectable fund. The society, in 1840, has 150 members, and the amount contributed last year in that same year, three fishing-boats were lost in Mount's Bay, involving the death of 30 persons, and the sudden impoverishing of 17 aged persons, 12 widows, and 36 children. A sum of money contributed to the bereaved survivors served to bring the uselessness of the society into notice. The Society progressed steadily. Between the years 1839 and 1864, it afforded relief to 30,000 shipwrecked persons, and to more than 14,000 widows, children, and dependants of fishermen and mariners, who had been drowned. The aid is not wholly eleemosynary; it partakes in some degree of the character of a provident fund. Primarily, the Society "boards, lodges, and conveys to their homes all destitute shipwrecked persons to whatever country they may belong, those who have lost all but their lives, or the means of subsisting, or the means of reaching those who have been drowned, and gives a gratuity to such members as, without losing life, lose or damage their apparel or boots by wreck or similar calamity. The longer the period during which a fisherman or mariner has been a member, the greater is the gratuity. Any widow and children in the event of his death by wreck or drowning. Every institution which fosters habits of provident forethought is worthy of respect and support; and the Society not only finds notice in one of the annual reports described. As the newly-charitable part of the plan, it ranks with a multitude of other praiseworthy modes of helping those who could help themselves.

It was found, however, in the course of years, that two societies—bearing the titles "National Shipwreck Institution," and "Shipwrecked Fisherman and Mariners' Royal Benevolent Society,"—were liable to be confused in the public mind; and a union or amalgamation became desirable. Accordingly, in the early part of 1855, the latter-named society transferred to the former all its property, assets, rights, and liabilities. The new "National Shipwreck Institution" at the same time changed its name to the "National Life-Boat Institution," to define more clearly the objects aimed at.

That the positive amount of good work rendered by the Life-Boat Institution is made manifest by the simple fact, that in 1857 alone the life-boats belonging to, or in connection with, the Institution, were the means of saving the lives of 300 persons, all of whom would probably have been lost but for such aid. The following is a list of the lives saved, for which rewards were given by the Society:

<table>
<thead>
<tr>
<th>Year</th>
<th>Lives Saved</th>
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<tr>
<td>1824</td>
<td>123</td>
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<td>211</td>
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<td>1854</td>
<td>203</td>
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<tr>
<td>Total</td>
<td>10,475</td>
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It may not be that these lives were all saved by the Institution; indeed such was not the case. In many instances the saving of life by the life-boats or other means did not involve any extraordinary risk, or the exercise of any remarkable skill or bravery, and it is only to such cases, whether performed by persons connected with the Society or strangers, that the rewards are distributed; and the list, therefore, only includes the cases of lives saved from shipwreck on our coast, in which the Society gave honorary or pecuniary rewards.

The life-boats belonging to, or in connection with, the Institution, in March, 1858, were no less than 70 in number, and there are 75 others provided from various sources, and not in connection with the Society. Considering that the boats usually cost from 100l. to 500l. each, the boat-carriages and the boat-houses about 100l., it will be seen that the amount of money thus sunk is something nearly as considerable as the Northumberland, the lifeboat or the Duchess of Argyll's 200l.; these are the counties most liberally provided. These boats, on an average, appear to be about 30 feet long by 6 feet broad, 2½ feet deep, weight 40 cwt., and are rowed by 8, 10 or 12 oars. The life-boats above adverted to, are purposely so constructed as to brave the peculiar dangers of a coast where shipwrecks are liable. Seventy years ago the construction of such boats began to attract attention; and in 1789 Mr. Greathead, of South Shields, constructed what may be deemed the original of all the life-boats since made. Cork was largely used in Greathead's boat to render it more buoyant; and since his time a light-tight cases, formed of India-rubber cloth, have been a favourite feature in many of the inventions. When the Duke of Northumberland offered the prize in 1860, no boat was placed on the market, considering the many modes of combining buoyancy with stability in boats. About 50 of the best of these models were placed in the Hyde-Park Exhibition. The prize was given to Mr. Beeching, of Yarmouth, for a boat, the construction of the boat which seemed to combine the greatest number of good qualities. Since that time a boat, invented by Mr. Peake, of her Majesty's Dockyard at Woolwich, has been more frequently adopted as a model than any other.

A boat built on the lines of the Greathead, in which there are numerous fittings necessary to render it workable: there must be a boat-house, in which to keep it sheltered from the weather when out of use; and a carriage wherein to wheel it to the place of disencumbering it in case of distressed or stranded ship. Moreover, there must be a crew of trusty men, able and willing to brave a raging sea, strong and resolute, to pull the oar under any stress of weather; and there must be a master or coxswain, exercising sufficient control to
command the men and direct their energies in a proper channel. It is the direct object of the present provision of life-boats and knoys, that the Life-Boat Institution has rendered service. A system of payment, partly in the nature of a salary, partly as a reward, is adopted, such as may induce steady men to render aid; and the local committee has found the object of the establishment is to be deferred, and in laying down the rules which are to govern the movements of the life-boat corps.

The exact mode in which a life-boat renders its useful service must depend, of course, on many contingencies of wind and tide. The following is an example:—On the 2nd of May, 1855, in early morning, the beachmen at Ramsgate heard alarms given, and saw signal-rockets fired on board the light-vessels moored off the Goodwin shoal. As the vessels were not in the perilous region. The Ramsgate life-boat (the property of the Ramsgate Harbour Commissioners) was speedily manned and equipped, and taken in tow by the Samson steam-tug against a rough wind and tide. The hapless ship was seen from the steamer with signals of distress flying, and apparently high and dry on the further edge of the Goodwin; the tide being low at the time, and a heavy sea on the edge of the sand. At a particular point the life-boat left the beach-tug and rounded towards the stricken vessel, but it was speedily found that the depth of water around the vessel was too small to permit a close approach by the boat. The men, therefore, waited until the in-coming tide favoured them a little; they went on; they ran on shore amongst the sand, they were dashed over the keel of the cutter, jumping overboard into the surf, waded to the ship, which they reached in an exhausted state. The ship was the Queen of the Teign, bound from Antwerp to Liverpool with a valuable cargo, of sugar, hemp, and seeds. When the crew of the ship saw the exertions of those who had undertaken to aid them, they descended from their vessel into a boat, jumped on the lee-side of the sand, and thence got into the life-boat. As soon as the tide had risen sufficiently to allow the steamer to approach the line was thrown on board here, and a communication being thus established, she was enabled to lay out an anchor to leeward, and subsequently to get her own large low-tide fast to the vessel. By these means the vessel was lost off from her dangerous position, and taken, in a leasy state, with four feet water in her hold, into Ramsgate Harbour.

Another example is worth noticing, as showing the recklessness of crews, and the probability that such recklessness frequently occasions loss of ships. On September 7th, 1855, the signals of distress were observed in the direction of the Holm Sand, off the Suffolk coast, during a strong easterly gale. The Pakfield life-boat immediately put off, towed by the Lowestoft steam-tug. Finding that it could not reach the vessel to be rendered assistance, the steamer opened fire on the ship, and a communication being thus established, she was enabled to lay out an anchor to leeward, and subsequently to get her own large low-tide fast to the vessel. By these means the vessel was lost off from her dangerous position, and taken, in a leasy state, with four feet water in her hold, into Ramsgate Harbour.

No part of our maritime system has, in recent years, attracted more attention than that which has just been illustrated—the personal character and conduct of the men employed. Who can tell the amount of misery which one hour of inebriety, one display of incompetency, may produce? The ship may be all that human art can effect, in strength and efficiency; the fittings and stores may all be that could be wished; the hatches may be good in kind and ample in quantity—and yet one slight manifestation of indiscretion or of unskilfulness, may give room for a catastrophe which will plunge scores or hundreds of human beings into a watery grave. This matter was taken up by the Legislature many years ago, and a great deal of money was invested in the system established in virtue of a statute presently to be noticed.

The life-boats of which we have spoken, are not the only means necessary for affording aid to stranded or wrecked vessels. There are others in use, but in no case as in the present is need is supplied; when a ship is in distress so near the shore as to be within reach of a rope, if means were at hand to throw it—while, perhaps, no boats are near the spot fitted to render the required service. The name of Captain Manby is intimately associated with the system of boats laid on shore for the purpose of conveying a rope to vessels in danger, and Manby's ingenuity was excited by a terribly distressing scene which he witnessed in 1807; when the Snipe, a gun-boat, was lost off Yarmouth; when sixty-seven persons were preserved, within sixty yards of land. The boats were five or six inches above the wreck, without a possibility of receiving assistance. Long before this, he had thought on the subject. He had, in 1783, thrown a line, by means of a small mortar, over Downham Church, in Norfolk; and it was known that he had been in the practice of the same. Manby was the first to put in practice a really available plan.

Let us see what is the end to be attained, that we may understand the mode of attaining it. A ship is stranded near the shore, say two or three hundred yards off, where there is a long beach, and boats cannot approach it; and the men of the vessel are drowned, or die of exposure. Sailors, unfortunately for themselves, are in too few cases swimmers; and even a swimmer has a poor chance for his life in such weather and such a sea as usually accompany these strandings of ships. The men generally choose the ship's boat as she is to be allowed her timbers will hold together, rather than strike out and endeavour to swim to shore. In such case their safety mainly depends on the establishment of some communication with the shore. Such communication was the object of Manby; and on the 3rd of March, 1808, a brig ran aground within a hundred and fifty yards of the Yarmouth coast; the crew lashed themselves to the rigging, and bore up against a furious storm as best they might—hoping almost against hope. All attempts to send off a boat to them failed. At length Captain Manby brought his mortar down from his residence to the coast, and succeeded in throwing a line over the ship, by which all the poor fellows were saved. Having thus given practical proof of what could be effected, Manby was instrumental in causing many mortars to be so applied on the coast. He frequently tried to obtain some recognition of his services from the Government; and in this matter he was more fortunate than many useful discoverers. He was unquestionably the first to adopt any means of communicating with vessels at sea. These boats have been tried in many vessels; and in many cases, both ships and boats have been saved by means of the ropes thrown out to stranded ships, through the agency of mortar-rockets. There are 196 places on the shores of the United Kingdom, where such apparatus is kept, mostly under the charge of the coast guard, who, from the peculiar nature of their other duties, are well adapted for this kind of service.

The articles transmitted to the Paris Exhibition of 1855, by the Life-Boat Institution, may be taken as a test of the present state of the art of this interesting question; and it is certain that the institution would be unwise to tardiness in practice, to be without arrangements for such assistance at once. The first was a model life-boat and carriage, as now adopted by the Institution, and stationed on many points of our coasts; the second, a boat, invented by Mr. Manby, which, one would imagine, was a model of which no improvement could be made; and Mr. Manby, 30 feet long, 7 feet wide, and 2 feet deep; it is considered to possess, in a high degree, seven qualities required in a life-boat—lateral stability, speed against a heavy sea; capability for landing on the beach; safety of discharge; and power of self-righting if upset, great strength, and storage-room for a number of passengers. Another specimen, was the life-boat which gained for Mr. Becoming, of Yarmouth, the prize of 200 guineas, in the Order of the Day of the French Government, and is better known than Mr. Peake's, but not quite so deep. A third was Mr. Palmer's life-boat, employed for many years by the Society, and stationed at many points on the coast. A
fourth was Mr. Ward Jackson's life-boat, such as is stationed at the West Harlpool Docks. Besides these boats there were several minor articles, such as travelling life-boat, to be used with the rocket and mortar apparatus; cork life-belts and life-boat, etc.; and so forth.

We have now reached the recent law concerning ship-wrecks. The year 1854 gave strength to the cause, by bringing the power of the government to bear upon it—not that such strengthening is necessarily a result; for the "right place, right time, and right person," nor do the government departments always do their utmost work at the right time; but it seems especially fitting that the legislature, and through it the executive, should have a voice in the shipping economy of a maritime nation. Mr. Cautley's Amendment, if it be properly handled, will do the necessary work. The Associate Board has been empowered to deal with the arrangements connected with the "Consolidate the Acts relating to Merchant Shipping;" it contemplates the Act 17 & 18 Vict. cap. 104, and received the royal assent August 10, 1854. The statute is of great length, and relates to eleven different topics, bearing upon the well-being of seamen and their ships; the relation of the Board of Trade to the Commercial Marine; the ownership, measurement, and register of British merchant ships; the qualifications of masters and seamen; the precautions and management of merchant ships, and the number and situation of pilots; the management and tolls of lighthouses; the constitution of the Mercantile Marine Fund; the laws relating to wrecks, casualties, and salvage; the liabilities of ship-owners; legal course of procedure in the event of misconduct on the part of owners or masters of merchant ships, and investigators in respect to wrecks and accidents, are to be appointed by the Board of Trade; new examinations for masters and mates are to be organised, separating foreign-going from home-trade passenger ships; the Board is empowered to IID. the necessary arrangements for the forecastle and storerooms, and mates, in case of misconduct or insufficiency; naval courts are to be instituted abroad or on the high seas, in correspondence with the Board, to inquire into cases of wreck, and report their findings; the boats to accompany all trading ships are denoted; every ship carrying more than ten passengers must be provided with a life-boat, or an ordinary boat rendered buoyant, and with two life-buys—the boat and buoys being always kept ready. In case of a life-boat being necessary, a man may be summoned by the Admiralty: iron steamers must have water-tight compartments, and safety-valves above or below the control of the engineer; sea-going ships must be provided with fire-engines and hoses, signals, guns, and ammunition for firing signals of distress.

Besides the provision for preventing wreck, the Act contains many clauses, applying to cases in which wreck may unhappily have occurred. As these arrangements are somewhat verbose, we may here quote a quarter of the Act, which may be considered as a specimen of the others:

"All matters relating to wreck are placed under the general superintendence of the Board of Trade, by whom 'Receivers of Wreck' are to be appointed. These receivers will have the charge of the coast and authority over all persons present at any wreck, or similar casualty, and power to issue such directions as may seem expedient for the preservation of life and property, or for the prevention of plunder and disorder. Whenever a ship is stranded, or otherwise in distress on British shores, bystanders are to be encouraged to render assistance, by having a pecuniary interest in the preservation of life or property. If services so rendered shall be instrumental towards the object in view, the persons shall have a claim on the owner of the ship for a 'reasonable amount,' and to ascertain what would be a 'reasonable amount' in each case; for enforcing the claim of the salvor against the disasters; for disposing of an unclaimed wreck; and for adding to the salvor's reward out of the Mercantile Marine Fund, in cases where life has been preserved, and where the wrecked ship is insufficient in value to pay the salvage awarded. The Mercantile Marine Fund here adverted to is made up in a curious way; it consists of certain fees received in connection with merchant-ships; lighthouse dues accruing by virtue of certain sections of the Act; rates accruing from lighthouse and ballastage in the Thames; and fees derived through the Bill of Wreck. The fund, kept with the aid of the Secretaries of the Board, and the payment of the salaries of examiners, surveyors, receivers, &c.; expenses in regard to lighthouses, buoys, beacons, lighthouse, ballastage, life-boats, &c.; and rewards to persons who assist in saving wrecked ships, or crews, or passengers. In pursuance of the powers conferred by the statute above sketched, the Board of Trade procured, early in 1855, to give effect to its provisions. Among other things, the Board addressed a circular to the Life-boat Committees throughout the United Kingdom. Considering that in 1854 no fewer than 1540 persons perished from wrecks on our own coasts, it is not too much to say that a wide field is yet open to the exertions of individual humanity and bravery. Doubtless, in many of these instances, there have been life-boats and willing aiders at the places where the calamities occurred. The principle intended by the Act, and entrusted to the Board of Trade for realisation, is not to induce the Board to interfere, but to bring all the assistance who will help themselves." A preparatory Circular was addressed to the several Life-boat Committees in September 1854, and this was followed by another in February 1855. The Circular dwelt strongly on the fact that the Board would insist on evidence of local activity before sanctioning grants out of the Mercantile Marine Fund. "In the wealthier and more populous portions of the kingdom, my Lords anticipate that the public spirit of the neighbourhood will promote the best result in reference to the Circular. In cases where a necessity for such assistance exists, the assistance contemplated by the Board of Trade will be confined to assisting towards the making and exercise of boats, and towards defraying expenses connected with actual service. The Circular is addressed to local Committees in correspondence with it, and they propose also to communicate from time to time with any Local Committee which may desire to address their communications directly to this department." The principal arrangements marked out in the Circular may be condensed as follows. Every Life-boat Committee must have as one of its members an officer of the Coast-guard, or of the Customs, or some official person connected with the Board of Trade. The Local Committee must be provided with a boat and boat-house satisfactory to the Board. The boats, house, and gear, must be kept in efficient repair, and accessible to the Inspector appointed by the Board. Each boat must have a coxswain, and a crew at least one-half more than is necessary to man the boat; permanent, if possible. The coxswain is to receive a small salary, and he, as well as the crew, are to receive certain specified rewards as payments for each time of exercising their duty. The Board of Trade is not intended to assist a wreck, and each time of undergoing special danger or fatigue. In the event of the death of any of the crew while on service, the Board will contribute towards a fund for the widow. All the payments are in the first instance to be made by the Local Committees, but to be accounted for by the Board of Trade when satisfactorily tested. Signal rockets and mortar apparatus on the coast are to remain under the charge of the coast-guard. The Life-boat Institution, to further the object held in view by the Board of Trade, also issued a Circular to the Local Life-boat Committees, containing advice and suggestions couched in more familiar language than a Government department is accustomed to employ. One extract will suffice to explain the principle of the Circular, and the care and skill which has been induced to tender their services in the hazardous duty of managing a life-boat. Speaking of the remuneration promised by the Board of Trade, the Circular says:—"The scale of payment for services in wreck cases has never before been paid, and is calculated to give every encouragement to seamen who engage in such an honourable and humane, yet often perilous, service. They conceive that the chief point in connection with it, which will call for the attention of the Committee, is the careful and discreet recommendation of the higher awards for extraordinary services; taking care never to do so but for those of a really distinguished character. The quarterly exercise of the life-boat should never be allowed. The Committee, as may be seen from the above extract, does not occur; the crew may still, with advantage, be exercised in rowing together, and the sound and tight condition of the boat herself, and the perfectness of her gear and
fittings ascertained; and if, from any cause, the greater part
of her ordinary crew are absent, she had nevertheless better
be taken aboard by any officer of the service into the port
who may be obtained, but always, if possible, in charge of the
permanent coxswain of the boat. The salary of the cox-
slain is double that which has previously been paid by this
institution. In return, it will be expected that they shall
devote the same amount to preserving the boats and
their appurtenances under their care in a constant state
of efficiency, and ready for instant service. With regard
to the hire of horses or steam-tugs, and the payment of persons
to assist in launching and hauling up life-boats, the attention
of the Local Committees will here be chiefly required to
check undue charges and to avoid incurring such expenses,
except when necessary. It is thought, also, that they may
do much good by endeavouring at all times to encourage
public spirit, and other disinterested motives, in those who
are called upon to assist on such occasions, and, as far as
possible, to devise such services of a meritorious character."
Under this Act, in 1857, the Board of Trade paid a total
sum of 6020l. for rewards, pensions, &c., and for maintaining
the Rocket and Mortar Apparatus.

SHIRE. See County Courts, S. 2, p. 156. Hundred
Courts and Courts Leet have long been almost entirely
obsolete, and the County Court statutes accordingly contain
provisions for the surrender of such courts by the lords
thereof to the Crown. It does not appear, however, that
any surrenders have yet been made.

SHOVELER. [Duck.]

SHRIMP, FRESH-WATER. [Gammarus.]

SICILY. The i-land has been described in vol. xx., but
it is now divided into seven provinces, the area, subdivisions,
and population of which, according to the latest returns, are
as follows:—

<table>
<thead>
<tr>
<th>Province</th>
<th>Area in</th>
<th>Districts</th>
<th>Communes</th>
<th>Population in 1851</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palermo</td>
<td>1964</td>
<td>4</td>
<td>72</td>
<td>814,717</td>
</tr>
<tr>
<td>Messina</td>
<td>1386</td>
<td>4</td>
<td>119</td>
<td>349,484</td>
</tr>
<tr>
<td>Catania</td>
<td>1761</td>
<td>2</td>
<td>86</td>
<td>375,991</td>
</tr>
<tr>
<td>Grecioli</td>
<td>1375</td>
<td>3</td>
<td>45</td>
<td>249,724</td>
</tr>
<tr>
<td>Note</td>
<td>1482</td>
<td>3</td>
<td>41</td>
<td>237,914</td>
</tr>
<tr>
<td>Trapani</td>
<td>1358</td>
<td>3</td>
<td>89</td>
<td>192,809</td>
</tr>
<tr>
<td>Gallitana</td>
<td>1190</td>
<td>3</td>
<td>81</td>
<td>180,791</td>
</tr>
<tr>
<td>Total</td>
<td>10,534</td>
<td>22</td>
<td>407</td>
<td>2,091,580</td>
</tr>
</tbody>
</table>

SILICA. [Silicium.]

SILURIAN SYSTEM. The following list of fossils, found
in this system, is given by Professor Phillips:—

<table>
<thead>
<tr>
<th>ANOMORPHOSA.</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acanthoconia (f)</td>
<td>1 Chneidium</td>
</tr>
<tr>
<td>Ortho</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FORMOSINERA.</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eudocarya</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ZOOPTA. (Zoantharia of Edwards)</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrobatia</td>
<td>1 Goniophyllium</td>
</tr>
<tr>
<td>Alcyon</td>
<td>4 Halysites</td>
</tr>
<tr>
<td>Acanthophyllium</td>
<td>1 Helioites</td>
</tr>
<tr>
<td>Actophyllium</td>
<td>1 Patella</td>
</tr>
<tr>
<td>Alcyonaria</td>
<td>4 Protogerimy</td>
</tr>
<tr>
<td>Cymopolia</td>
<td>1 Socinula</td>
</tr>
<tr>
<td>Cystophyllium</td>
<td>1 Stenopora</td>
</tr>
<tr>
<td>Cerites</td>
<td>5 Siphonites</td>
</tr>
<tr>
<td>Cyathophyllium</td>
<td>1 Stromatopora</td>
</tr>
<tr>
<td>Cyathophyllium</td>
<td>4 Syringopora</td>
</tr>
<tr>
<td>Dicyophyllium</td>
<td>1 Thecia</td>
</tr>
<tr>
<td>Ptilophyllium</td>
<td>1 Zephalit</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ACTINIRARIA.</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Didimographeus</td>
<td>3 Graptolithus</td>
</tr>
<tr>
<td>Diplographeus</td>
<td>10 Radiolites</td>
</tr>
<tr>
<td>Gorgone</td>
<td>4 Radiolites</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HYDRODIA.</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oldhamia</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ECHINODERMATA.</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceratoatomion</td>
<td>3 Monocirrhius</td>
</tr>
<tr>
<td>Crotaloocharis</td>
<td>1 Periechondrias</td>
</tr>
<tr>
<td>Cystoecirrhius</td>
<td>1 Sycophyllous</td>
</tr>
<tr>
<td>Diplolophiurum</td>
<td>3 Sycophyllous</td>
</tr>
<tr>
<td>Diplolophiurum</td>
<td>1 Trimerocirrhius</td>
</tr>
<tr>
<td>Ichthyocirrhius</td>
<td>2 Tarotereon</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CYTIDIIDEA.</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cystothyraon</td>
<td>1 Echinophractites</td>
</tr>
<tr>
<td>Apioptes</td>
<td>1 Hemiocranites</td>
</tr>
<tr>
<td>Coryphophyllum</td>
<td>5 Prinocirrhius</td>
</tr>
<tr>
<td>Echinophyllum</td>
<td>2 Pseudocirrhius</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ARTICULATA.</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acroperus</td>
<td>1 Urate</td>
</tr>
<tr>
<td>Lepidopterus</td>
<td>1 Plectron</td>
</tr>
<tr>
<td>Clypeolites</td>
<td>1 Echinomeles</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PALACINUS.</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agaeoptes</td>
<td>1 Nereites</td>
</tr>
<tr>
<td>Cymolites</td>
<td>1 Serpula</td>
</tr>
<tr>
<td>Polyps</td>
<td>2 Spirillaria</td>
</tr>
<tr>
<td>Lutaria</td>
<td>5 Testudinaria</td>
</tr>
<tr>
<td>Myriapora</td>
<td>2 Tracheloderma</td>
</tr>
<tr>
<td>Myriapora</td>
<td>2 Tracheloderma</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CEPHALAC.</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acidaspis</td>
<td>10 Harpae</td>
</tr>
<tr>
<td>Aegina</td>
<td>2 Homaloscutus</td>
</tr>
<tr>
<td>Aegina</td>
<td>4 Heteromus</td>
</tr>
<tr>
<td>Amphion</td>
<td>1 Ichias</td>
</tr>
<tr>
<td>Ampyx</td>
<td>5 Ogygis</td>
</tr>
<tr>
<td>Anemone</td>
<td>7 Oenostrematula</td>
</tr>
<tr>
<td>Arenula</td>
<td>3 Paracocophyllus</td>
</tr>
<tr>
<td>Calymene</td>
<td>6 Phacopsis</td>
</tr>
<tr>
<td>Chloroptes</td>
<td>4 Proutia</td>
</tr>
<tr>
<td>Conchonoptes</td>
<td>4 Remoliporilus</td>
</tr>
<tr>
<td>Cyathophyllum</td>
<td>2 Siphonites</td>
</tr>
<tr>
<td>Cymophyllum</td>
<td>1 Sphaerocrustis</td>
</tr>
<tr>
<td>Cyathophyllum</td>
<td>1 Sphaerocrustis</td>
</tr>
<tr>
<td>Cyathophyllum</td>
<td>1 Sphaerocrustis</td>
</tr>
<tr>
<td>Deiphan</td>
<td>1 Terebila</td>
</tr>
<tr>
<td>Ectopoechele</td>
<td>1 Trinucleus</td>
</tr>
<tr>
<td>Euceratina</td>
<td>4 Enchytraeida</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OTHER ENTOMOPODIA.</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beyrichia</td>
<td>3 Euryptastes</td>
</tr>
<tr>
<td>Ceratoconias</td>
<td>3 Hemiocranites</td>
</tr>
<tr>
<td>Ophiura</td>
<td>1 Leptochates</td>
</tr>
<tr>
<td>Dicyrochura</td>
<td>1 Pterygotus</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BRITOA.</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cellaraya</td>
<td>1 Heteropora</td>
</tr>
<tr>
<td>Ceratopora</td>
<td>1 Intracirrhius</td>
</tr>
<tr>
<td>Diadocira</td>
<td>2 Oldhamia</td>
</tr>
<tr>
<td>Diadocira</td>
<td>2 Oldhamia</td>
</tr>
<tr>
<td>Discopora</td>
<td>3 Oplegaria</td>
</tr>
<tr>
<td>Edociri</td>
<td>1 Psamophylla</td>
</tr>
<tr>
<td>Fenestella</td>
<td>1 Rhaphioptes</td>
</tr>
<tr>
<td>Glauconome</td>
<td>1 PSamophylla</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BRACHIOPODA.</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambyris</td>
<td>6 Chotactes</td>
</tr>
<tr>
<td>Atropora</td>
<td>4 Orania</td>
</tr>
</tbody>
</table>

Digitized by Google
Seminated silver; they are found near the surface, where the rock has undergone partial decomposition. The sulphur of lead, iron, and copper, of the mining regions, generally contain silver, and are also worked. (Dana.)

The principal mines of silver in Europe are those of Spain, of Kongeborg in Norway, of Saxony, the Hartz, Austria, and Russia.

In England, argentiferous galena is worked for its silver. Forty thousand tons of this ore were reduced in 1837, while contained upon an average about six ounces of silver in a ton of lead.

The annual product of the several countries of Europe is thus estimated by Dana in his Manual of Mineralogy:—

<table>
<thead>
<tr>
<th>Country</th>
<th>Silver (Pounds Troy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>British Isles</td>
<td>7,900</td>
</tr>
<tr>
<td>France</td>
<td>4,100</td>
</tr>
<tr>
<td>Austria</td>
<td>63,000</td>
</tr>
<tr>
<td>Sweden and Norway</td>
<td>13,000</td>
</tr>
<tr>
<td>Spain</td>
<td>189,000</td>
</tr>
<tr>
<td>Saxony, the Hartz, and other parts of Germany</td>
<td>78,500</td>
</tr>
<tr>
<td>Belgium</td>
<td>440</td>
</tr>
<tr>
<td>Piedmont, Switzerland, and Saxony</td>
<td>1,500</td>
</tr>
</tbody>
</table>

SIMCERE. [CAMARA, S. S.]

SIMETHIS; a genus of Plants belonging to the natural order Liliaceae, and the tribe Anthericaceae. The parts of the perianth are six, spreading, deciduous; the stamens are attached to the base of the perianth; the filaments bearded; the anthers incumbent; the capsules are 3-celled, and each cell contains two seeds.

*S. bicolor* is a recent addition to the British Flora. It is a native of the South of Europe, and is found on sandy heaths near the sea-shore. In England it was first found at Bournemouth, in Dorsetshire. It has also been found at Derry-noo, Kerry, in Ireland. This plant has linear leaves, flat, or a little keeled upwards. The flowers are panicked, the petals are purple without, and white within. In Hooker and Arnott’s ‘British Flora’ it is suggested that this plant may have been introduced with trees from France.

SIMIADIE. In the list of the specimens of *Mammalia* published by Dr. J. E. Gray, we find almost a complete representation of this family. They are as follows:—

<table>
<thead>
<tr>
<th>Family</th>
<th>Genera</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soricidae</td>
<td></td>
</tr>
<tr>
<td>Cricetidae</td>
<td></td>
</tr>
<tr>
<td>Hystrix</td>
<td></td>
</tr>
<tr>
<td>Bilophonia</td>
<td></td>
</tr>
<tr>
<td>Pteropoda</td>
<td></td>
</tr>
<tr>
<td>Gasteropoda</td>
<td></td>
</tr>
<tr>
<td>Asterochenia</td>
<td></td>
</tr>
<tr>
<td>Cyrtoceres</td>
<td></td>
</tr>
<tr>
<td>Murochonia</td>
<td></td>
</tr>
<tr>
<td>Onchus</td>
<td></td>
</tr>
<tr>
<td>Plectrodes</td>
<td></td>
</tr>
<tr>
<td>Ormeus</td>
<td></td>
</tr>
<tr>
<td>Pteropus</td>
<td></td>
</tr>
</tbody>
</table>

Of the above list, 496 were found in the Upper Silurian; 465 in the Lower Silurian; and 10 in the Cambrian.

The Silver of South America is derived principally from the Horn Silver and Bitter Silver-Ore, including Arensenurtted Silver-Ore, Vitreous Silver-Ore, and Native Silver. Those of Mexico are of nearly the same character. Besides, there are earthy ores called Colorado, and in Peru Pasco, which are mostly earthy oxide of iron, with a little di-
The Five-Fingered Mirkit (Brachytes arachnoides; Simia arachnoides, Humb.). Tropical America. The Black-Foreheaded Mirkit (B. frontatus). Tropical America.

The Mirkit (B. hypochondrius). Tropical America.

The Mirkit, or Negro Monkey (Logotheria Humboldti, Geoff.). Brazil.

The Aragatou, or Brown Howler (Myctetes urinus). Guiana.


The Caraya, or Black Howler (M. caraya; Simia caraya, Humb.). Brazil.

The Guha, or Yellow-Headed Howler (M. beddoldtii; Simia beddoldtii, Linn.). Brazil.

The Tufed Capuchin (Cebus cirrifer, Geoff.). Brazil.

The Kite, or Horned Capuchin (C. fuscus, Erzl.). Brazil.

The Capuchin (C. apella, Erzl.; Simia apella, Linn.). Brazil.

The Hiarang, or Yellow-Headed Capuchin (C. xanthocheston). Brazil.

The Sui, or Weaver (C. capucinus, Erzl.; Simia capucinus, Linn.). Brazil.

The White-Headed Saapaju (C. hypoleucus, Geoff.). America.

The Yellow Saapaju (C. gracilis, Spix). Brazil.

The Golden-Headed Saapaju (C. chryopus, F. Cuv.). Brazil.

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SIPUNCULIDEA, an order of Echinodermata. Animals, embracing the families Sipunculidae, Priapulidae, and Terebellidae. This order is divided into three families: The cutaneous envelops are coriaceous, and free from calcareous corpuscles; there is no calcareous ring about the oesophagus; the body is cylindrical; the digestive canal runs asymmetrical.

1. The Sipunculidae (Syphon-Worms) have a retractile proboscis, the base of which is in the umbilicus, and round the extremity of which there is a circle of tentacles. This family embraces the genera Sprinea, Sipunculus, and Phazo-sclera.

Sipunculus (Bodachus) has a cylindrical proboscis shorter than the body, leaving a circle of short-fingered tentacles around its tip. In his 'History of British Star-Fishes,' Forbes refers three British species of Sipunculus of other authors to this genus—S. nudus, S. papillosus, and S. Harvetti. Sipunculus (Linnæus) has a cylindrical form about as long as the body, and a circle of simple linear tentacles around its tip. The following are British species of this genus—S. Bernardus, S. Johnstonei, S. saccasti, S. tenaci-setus, S. Forbesi, S. granulatus, S. punctatus, and S. Pallasi.

2. The Priapulidae (Tailed-Worms) have a retractile proboscis without tentacles, and the vent at the end of a long thread-like tail.

Priapulus (Lamarck) has the body truncated behind, and the proboscis truncated and pointed.

The only British species is P. caudatus, which is only rarely taken.

3. The Thalassemae (Spoon-Worms) have a body oval or oblong, with a long, fleshy appendage; vent at post-anterior extremity, tentacles none.

Thalassema (Cuvier) has a cylindrical body rounded and smooth behind; the proboscis retractile, short, furnished at one side with a long fleshy furrow—sole sheet, which is not retractile. T. Nepige (British species).

Echinurus (Cuvier) has a cylindrical body, set at its hinder extremity with circles of bony points, and a proboscis as in Thalassema. [Echinodermata; Thalassema] E. oxyurus is a British species.

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and Analysis of the Peculiar Doctrines of the System of Political Economy founded by Ricardo. His most popular work was "The Diary of a Cudge" (1828), and his "Rambles and Recollections of an Indian Officer" (1843), a work which has been pronounced by competent authorities to be the best adapted of all existing treatises on British India, to give an Englishman a faithful picture of the actual state of the religious, social, and political conditions of the people of that country. He lived to see his measures with regard to Oude carried into effect by his successor, Sir James O ASTM, and to hear of the proclamation of Lord Dalhousie, announcing the annexation of the province of Oude, and the establishment of direct British rule.

Thoroughly rejected SMITH, as Dean of Stou, the his his work was obtained in England, with conspicuous success. He died in 1856, and was buried in the churchyard of Stou.

The theatrical enterprises of James Smith were chiefly associated with his paternal district. He carried on the work of improving the condition of the labouring classes, and of advancing the cause of religion and humanity by the suppression of Thuggee.

SMITI. [BROOKHAMSHIRE.]

SMELT. [SALMONDIN.]

SMILACIN. [CHEMIST, E. L.]

SMITH, JAMES, the great propagator of the system of deep ploughing and thorough draining, was born at Glasgow on the 3rd of January 1798. His father had been in business at Glasgow, and in which he acquired some property, but died when his son was only two months old, leaving him in the care of his grandfather, who was a day laborer in the country district of Carstoun in Stirling. After her husband's death Mrs. Smith resided with her brother, who was the manager of an extensive cotton manufactory at Deanston, a few miles from Stirling. Here he received his early education, and completing it at the University of Glasgow. On leaving the university he returned to his uncle, who had by the time removed to the Catrine Works in Ayrshire, where, in order to attain a thorough knowledge of the trade, he worked through the various grades, laboring with persevering industry for twelve hours a day, with such good effect that at eighteen he was entrusted with the entire management of the works at Deanston, into which he subsequently introduced many improvements in the process of the labourers. He was then discharged with the report by Mr. Chadwick, "A Report on the Sanitary Condition of the Labouring Population of Great Britain," published in 1841.

But Mr. Smith's attention had been early given to agricultural processes, and his intimate acquaintance with manufacturing machinery was made available in gratifying his predilection. The Dalkeith Farmers' Club having offered a prize of 500l. for a reaping-machine, Mr. Smith produced one, which, though it was not successful in obtaining the prize, it is said that he was requested by another to produce another in 1813. For this, though an accident prevented his gaining the prize, he received presents from several Scottish agricultural societies, and a gold medal from the Agricultural Society of Edinburgh. He had the management of his uncle's farm, and made such arrangements for improving the crops that his uncle's consent to carry out a full development of his theories. In 1823 however he became possessed of the farm of Deansston, about 200 acres of extremely poor land, having a soil not averaging more than four inches in depth, formed chiefly of the débris of the old red sandstone, with a subsoil partly of sandy clay and partly of a compact soil with stones, and the whole interspersed with boulder stones, producing little but rushes in the stately hollows and broon on the dry portions. The whole of this he intersected with drains, laid at distances of 31 feet and at a depth of 30 inches. This, and a subsoil plough to stir the ground deeply without bringing the subsoil to the surface, produced an effect on the crops that proved the soundness of his theory. In 1833 he published a pamphlet on "Thorong Draining and Deep Ploughing," which excited immediate attention among his more immediate neighbours, but it was several years before its merits were generally acknowledged and the practice it recommended was adopted.

In 1846 Mr. Smith was appointed one of a commission to inquire into the health and sanitary condition of our manufactories. One of his recommendations was the removal of the sewage for agricultural purposes; and he believed many difficulties to be overcome in effecting this, and Mr. Smith gave much attention to plans for overcoming them, proposing several means of singular mechanical ingenuity combined with simplicity. After considerable opposition an act of parliament was passed enabling municipalities to adopt his scheme where circumstances admitted of it. He also suggested several valuable improvements to the Agricultural Society of Edinburgh, and was a member, as he was also of the Glasgow Philosophical Society, to whose "Transactions" he was an occasional and valuable contributor. In political economy Mr. Smith was a follower of Adam Smith, and of course opposed to protection, holding that the increase of national wealth was the great end of government. After a life of almost incessant activity, he died on the 10th of June 1860, somewhat suddenly, having retired to bed on the 9th apparently suffering nothing but an accustomated feeling of weakness, which was not immediately removed. SMITH, JAMES, and HORACE, were the sons of Robert Smith, of London, an eminent legal practitioner and Solicitor to the Ordinance. James Smith was born Feb. 10, 1775, in London, where also Horace Smith was born in 1780. James Smith was engaged with his cousin, John Rev. Mr. Burford, at Chigwell, in Essex, was articled to his father, and in one year was taken into partnership. He eventually succeeded his father in the business and in the appointment of Solicitor to the Ordinance. Horace Smith became by profession a stockbroker.

The first literary productions of the two brothers were gratuitions contributions to "The Pic-Nic," a periodical started by Colonel Greville, in 1802. "The Pic-Nic" was soon merged in "The Cabinet," which maintained a stringing connexion till 1805. After that, "The London Review," of which Horace Smith was editor, was founded in 1817, and "The Quarterly Review," of which James Smith was editor, was started by Cumberland, the dramatist, on the principle of each writer affixing his name to his criticisms. James Smith wrote one of the articles, but the "London Re- view," after a coup with John Stuart, was disestablished and Horace Smith wrote several of the prefaces to a new edition of "Bell's British Theatre," which was published about this time under the sanction of Cumberland's name. They were also contributors from 1807 to 1810 to the "Monthly Mirror," in which they occasionally appeared. The poetical imitations entitled "Horace in London," which were subsequently published in a small volume. Horace Smith wrote several of these parodies, but the larger number were written by James Smith.

The London Review which the two brothers enjoyed arose chiefly from the "Rejected Addresses," a small volume which was published on the opening of the new Drury Lane Theatre, in October 1812. The committee of management had issued an advertisement requesting that addresses, one of which should be spoken on the first night, might be sent in by way of competition. As all the addresses sent in, except one, were to be rejected, Mr. Ward, secretary to the theatre, casually started the idea of publishing a series of these rejected addresses. The first edition appeared two days before the opening of the theatre. The brothers eagerly adopted the suggestion, and having immediately settled what authors each should imitate, Horace left London on a visit to Cheltenham, and James remained at home. Horace having succeeded in making a selection of very eminent writers, sent the manuscripts of the rejected addresses two days before the opening of the theatre. Each then submitted his productions to the other; a few verbal alterations were made, a few lines were added, and the little book was immediately printed and published. It was received by the public with enthusiastic delight. As the "Rejected Addresses" are humorous imitations mostly of authors well known, and as the work is still in circulation, it is perhaps worth while to mention that the imitations of Wordsworth ("Baby's Dobe"), Cobett ("Hampshire Farmer's Address"), Southey ("The Rebuilding"), Coleridge ("Premonial Hasting"), and Crabbe ("The Theatre"), are by James Smith, as well as the scenes styled "Drury Lane Hasting," the "Theatrical Alarm Bell" (an imitiation of "The Alarm Bell"), and the passage of the "Swallows" "Meschet," "George Barnwell," and "The Stranger." The rest of the imitations are by Horace Smith. The copyright, which was originally offered to Mr. Murray for 200l., was purchased by him in 1819, after the sixteenth edition, for 1l. 1s. 4d.

Besides a great number of amusing trifles which James Smith contributed to the periodical literature of the day, he was a gratuitions contributor to the earlier series of theatrical entertainments entitled "At Home," in which the older dramatists were published together with many original pieces of humorous imitation. Subsequently, for the "County Cousins," the "Trips to Paris," "Air-Ballooning," and the "Trip to America," he received from Mr. Mathews altogether 1000l. "You are the only man in London," said Mathews to James Smith, "who can write what was, good nonsense."
The brothers were both admired for their conversational powers. James Smith especially had a large circle of acquaintance, and went much into society. Though he was always a man of temperate habits, he became in middle life subject to attacks of gout, which increased in frequency and severity till he gradually lost the use of his limbs, and could only move himself by the aid of crutches. He died in London, December 34, 1836. In early and middle life he was distinguished mainly beauty both of figure and face. He was never married.

Horace Smith contributed numerous pieces of poetry, half playful, half sentimental, to the 'New Monthly Magazine,' while it was under the editorship of Thomas Campbell, the poet, and also several of the Holy Scriptures and some of the New Testament, published in 1835. In the twenty-third year of his 'Life and Mission,' 1846, was the latest. In the intermediate twenty years he gave the public 'Brumelhote Home,' 'Terror Hill,' 'Reuben Apley,' 'Zella,' 'New Forest,' 'Walter Colyton,' 'Jane Lomax,' 'The Moneyed Man,' 'Adam Brown,' 'Artur Arnold,' and others. Horace Smith died July 13, 1849, at Tunbridge Wells. He was a widower, and left two daughters.

(System, Letters, and Comic Miscellanies in Prose and Verse, by the late James Smith, Esq., one of the authors of the 'Monthly Magazine,' dedicated to his brother, Horace Smith, Esq., 3 vols., cr. 8vo, 1840.)

SMITH, JOHN PYE, D.D., LL.D., one of the most learned ministers and theological tutors of the Independent or Nonconformist denomination in Great Britain. He was born in the town of Homerton, in the parish of Hackney, London, on May 29, 1774. In his early years he was employed in the shop of his father, who carried on a respectable bookselling establishment in Sheffield; but always a diligent student, and becoming strongly impressed with religious feelings, he became desirous of entering upon a ministerial career; accordingly left business, and in his twenty-second year entered the Independent Academy at Rochester. Here he devoted himself zealously to the studies of the place, and such was the character he attained for ability and learning that, on a vacancy taking place in the Homerton Independent Theological Academy, Mr. Smith was chosen in 1800 to occupy the post of classical tutor in that seminary. At Homerton he subsequently formed a church, of which he became pastor, and which increased so largely in numbers as to require a separate chapel. In 1807 he received the diploma of D.D. from Yale College, Newhaven, Connecticut. In 1813 Dr. Pye Smith gave up the situation of resident classical tutor, retaining at the request of the directors the post of divinity tutor. In 1817 he was elected as a trustee of the College, Aberdeen. Dr. Smith became again in 1843 the resident tutor at Homerton, which office he filled till the breaking up of the establishment in 1850, when New College, St. John's Wood, was formed from the juncture of Homerton, Macclesfield, Manchester, and Chesham. He had been for many years afflicted with deafness, then retired from active duty, and his friends and admirers testified their regard for his character by raising a sum of 3000l. to provide an annuity for him while he lived, the interest to be afterwards devoted to the foundation of a Smith scholarship in New College. Dr. Pye Smith died on February 6, 1861, in his seventy-seventh year. Dr. Pye Smith was held in unusual regard by all who knew him, as much for the singularly happy subject matter of his life, as for his earnestness and devotion in his official duties, and his extensive erudition. He had been twice married.

Dr. Smith was a man of uniting industry, as well as of very unusual acquirements. He published numerous works on theological subjects; and especially the science of geology. His great work was 'The Scripture Testimony to the Mosaic,' 2 vols., 1818 and 1821. The remarkable range of reading which this work displayed, and particularly its familiarity with modern geographical research, and with the attainments of English divines, and especially with those of the Nonconformist body, attracted great attention to the work, and though some of the positions of the author were regarded as questionable by many theologians who agreed with him about the inspired origin of the books of the Bible, he was considered a high place, and eventually came to be pretty generally regarded as a standard work on the subject of the divinity of Christ, and as perhaps the most important work of the kind on the orthodox side of the question. In subsequent edi-

tions the work was in parts considerably enlarged, and in some respects modified; and in its final shape it may be regarded as embodying almost the whole of the erudition on the important subject of which it treats. The fourth edition was published in 1847. It was in the middle of which were a controversial character, may be summarized—'The Adoration of our Lord Jesus Christ vindicated from the Charge of Idolatry, a Sermon,' 1811. 'Four Discourses on Natural and Practical Science,' third edition, 1847. On the Personality and Divinity of the Holy Spirit, a Sermon,' 1831. 'The Mosaic account of the Creation and the Deluge, illustrated by the Discoveries of Modern Science,' fourth edition, 1848. Dr. Pye Smith was a Fellow of the Royal Society and of the Geological Society, and took a deep interest in the philanthropic and religious movements of the day.

SMITH, JOSEPH, founder of the religious body commonly known as Mormons, but called by their founder and by themselves 'The Church of Jesus Christ of Latter Day Saints.'

Whether regarded as a religious, political, social, or intellectual phenomenon, the rise and progress of Mormonism is one of the most remarkable movements of modern times; and a calm survey of its origin and development, made with a view to arrive at a true knowledge of the facts, and, as far as practicable, to comprehend, that is, like the system and its effects, the character of its founders, and its influence on its disciples—could not but be serviceable as well as interesting. Such a comprehensive statement as that which will be attempted in the present article will be to give a sketch of the founder of Mormonism, and of the system as he left it. Its subsequent development and present state will be noticed under Utah, S. 2.

Joseph Smith published an autobiography; and a strange book purporting to be written by his mother has been published, under the title of 'Biographical Sketches of Joseph Smith, the Prophet, and His Progenitors for many Generations, by Lucy Smith, Mother of the Prophet.' Of these, as well as the notices of him by his adherents and opponents who profess to have obtained their information respecting him at first hand, we have made use; but we prefer to let the Prophet in a measure tell his own story as we find it in a short sketch of himself and his system, which he supplied a few months before his death to Mr. Daniel Rupp for that gentleman's 'Original History of the Religions Denominations at present existing in the United States,' 5vo, Philadelphia, 1844, and which may consequently be considered as an extract from the autobiography of what Smith himself wished to be believed.

He says—

"I was born in the town of Sharon, Windsor County, Vermont, on the 23rd of December, 1805. When ten years old, my parents removed to Palmyra, New York, where we resided about nine years. Among this number was a man named James, who had confidences in the declaration of James, 'If any man lack wisdom let him ask of God, who giveth to all men liberally and upbraideth not, and it shall be given him.'

"I retired to a secret place in a grove, and began to call upon the Lord. While fervently calling upon the Lord, my mind was taken away from the objects with which I was surrounded, and I was transported in a heavenly vision, and saw two glorious personages, who exactly resembled each other in dress and feature, and who were in the air, as if they had entered which eclipsed the sun at noonday. They told me that all the religious sects were believing in incorrect doctrines, and that none of them was acknowledged of God as his Church and Kingdom. And I was expressly commanded to 'go not after them,' at the same time receiving a promise that the fulness of the Gospel should at some future time be made known to me."

This "fulness of the Gospel," was that revealed in the Book of Mormon; and as his account of the discovery of the
book and its contents is really the point on which our estimate of it, and the doctrine must to a great extent turn, it will be best given in its own words and without abridgment. He says:—":On the evening of the 21st of September, A.D. 1823, while I was praying unto God and endeavoring to exercise faith in the promises of Solomon, and was engaged in prayer, it suddenly flashed into my mind, that I was surrounded by purer and more glorious appearance and brightness, burst into the room; indeed, the first sight was as though the house was filled with consuming fire. The appearance produced a shock that affected the whole body, and was at the same time, a personage stood before me, surrounded with a glory yet greater than that with which I was already surrounded. The messenger proclaimed himself as an angel of God, to bring to the joyful tidings, that the covenant which God had made with the Jaredites, was at hand to be fulfilled, and the preparatory work for the second coming of the Messiah was speedily to commence; that the time was at hand for the Gospel in all its fulness to be preached in power unto all nations, that a people might be prepared for the Millennial reign.

"I was informed also concerning the aboriginal inhabitants of this country (America) and shown who they were, and from whence they came;—a brief sketch of their origin, progress, civilization, language, government, and form of society, with a prospect of their future and the blessings of God being finally withdrawn from them as a people, was made known unto me. I also was told where there were deposited some plates, on which was engraved an abridgment of the records of the ancient Jaredites, which existed in the temple of Solomon. The angel appeared to me three times the same night, and unfolded the same things. After having received many visits from the angels of God, unfolding the majesty and glory of the events that should transpire in the last days, on that morning of the 22nd of September, 1823, the angel of the Lord delivered the records into my hands.

"These records were engraved on plates which had the appearance of gold; each plate was six inches wide and eight inches in height; they were not quite square. They were filled with engravings in Egyptian characters, and bound together in a volume, as the leaves of a book, with three rings running through the whole. The volume was something near six inches in thickness, a part of which was sealed. The characters on the unsealed part were small and beautifully engraved. The whole book exhibited many marks of antiquity in its construction, and much skill in the art of engraving. With the records was found a curious instrument which the ancients called 'Urim and Thummim,' with the following inscription in that language: a bow fastened to a breastplate. Through the medium of the Urim and Thummim I translated the record by the gift and power of God.

"The most convenient and interesting book of the history of ancient America is unfolded from its first settlement by a colony that came from the tower of Babel, at the confusion of languages, to the beginning of the 5th century of the Christian era.

"We are informed by these records, that America, in ancient times, has been inhabited by two distinct races of people. The first were called Jaredites, and came directly from the tower of Babel, about 600 years before Christ. They were principally Israelites of the descendants of Joseph. The Jaredites were destroyed about the time that the Israelites came from Jerusalem, who succeeded them in the inheritance of the country. The principal nation of the Jaredites is said to have been the 4th millennium of the 4th century. This book also tells us that our Saviour made his appearance upon this continent after his resurrection; that they had apostles, prophets, pastors, teachers, and evangelists; the same order, the same priesthood, the same ordinances, gifts, and blessings, as was enjoined upon the eastern continent; that the people were cut off in consequence of their transgressions; that the last of the prophets who existed among them was commanded to write an abridgment of the prophetic history, that had existed on this continent, for the earth, and that it should come forth and be united with the Bible, for the accomplishment of the purposes of God in the last days. For a more particular account I would refer to the Book of Mormon.

"While I was thus considered, the Prophet's narrative. It will have been noticed that the account of his early life, and of his proceedings between the first appearance of the angel and the discovery of the plates, is remarkably vague. His education had evidently been of the rudest kind. From various accounts, including those of his mother, it would seem that he used to assist his father in his business, but that he was of an unsettled disposition, and probably spent a good deal of time in wandering about the country. It is stated that he was induced to the pursuit of learning by trying for mineral veins by a divining-rod, and some affirm that, like Sidrophel, he used "the devil's looking-glass—a stone," and was consulted as to the discovery of gold. It is said that he was familiarly known as the "money-digger," and on one occasion he had been, at the instigation of a disappointed client, imprisoned as a vagabond. He is also stated to have carried off and married a Miss Hales, during the interval between the first angelic visitation and his introduction to the Urim and Thummim."

"As to the Book of Mormon itself, the authorship has been claimed for one Solomon Spalding, a Presbyterian preacher, who having fallen into poverty composed a religious romance, entitled 'The Manuscript Found,' which professed to be a narrative of the migration of the Lost Tribes of Israel from Jerusalem to America, and their subsequent adventures on that continent, in the hope of obtaining enough from its publication to release him from his difficulties. The work was not completed at the time of the author's death; but ten years after his death, the manuscript was carried by his widow into New York, where it was stolen by or somehow got into the hands of Smith, or Rigdon (an early associate in his proceedings). The statement is supported by affidavits from James Hargrave, Robert Hales, and some other persons, who declare that they had heard him read portions of the work which were substantially the same as parts of the Book of Mormon. The story is incoherent in its details and the authenticity of the affidavits does not seem clear; but the work itself appears to be very well with such an origin, supposing, that is, that the Presbyterian preacher, as might well have been the case, was a rude-minded uneducated man, sufficiently familiar with the history of the United States and with the time of the Mormonites, and who, in writing this romance, employed a knowledge of the tongue, and made use of the easily-obtained information respecting the ruins of ancient 'towns and temples,' which have been discovered in various parts of America, as a groundwork for his narrative. The book itself is (even now that its gross grammatical errors are said to have been expunged) a singularly ill-written one, and how any decently-educated man could have written it as a book to be read for amusement would be inconceivable, were it not that experience teaches us that authors are by no means always in good faith. There is also, in this work, as there is certainly nothing in the book to contradict the supposition that it is the work of Smith himself—for as to its being a divine revelation, the most cursory examination of it will demonstrate its utter improbability of that, if its possibility were otherwise conceivable. Be the author who he may, Smith having obtained the book—whether from Solomon Spalding's travelling chest, his own brain, or the stone-box which the angel discovered to him—thought it behoved him to conceal his treasure known. At first he told the members of his own and his father's household, and, more fortunately than Mahomet, found little difficulty in persuading them of the truth of his mission and the reality of the gift. But he says:—"As soon as the news of this discovery was made known, false reports, misrepresentation, and slander flew, as on the wings of the wind, in every direction. My house was frequently beset by mobs and evil-designing persons; several attempts were made to destroy the book, and the device was made use of to get the plates away from me; but the power and blessing of God attended me, and several began to believe my testimony."

"Among those whom he told of the discovery was a far named Hare, whom he persuaded to convert his stock in money into order to assist in printing the book. But Harris wanted to consult some scholar, and Smith was induced to entrust him with a copy of a portion of one of the golden plates together with a statement of the facts as related by Anthon, who according to the triumphant declaration of the Mormonites, was unable to make out the characters, which he described to be "reformed Egyptian"—and this is one of the proofs cited by Mormonite teachers of the authenticity of the book. Dr. Anthon's family is different. He says that he at first supposed the paper to be a hoax, and gave little heed to it; but on hearing the man's
story, he assured him that the work was an imposture, and strongly advised him not to have anything to do with it. The paper itself he thus describes (and it is the only description of the "Book of Mormon" which has been published), in fact, that its appearance consisted of all kinds of fiction, characters, disposed in columns, and had evidently been prepared by some person who had before him, at the time, a book containing various alphabets. Greek and Hebrew letters, crosses and flourishes, Roman numerals, and, from that time, a most astonishing rapidity, and churches were soon formed in the states of New York, Pennsylvania, Ohio, Indiana, Illinois, and Missouri. In the last-named state a considerable settlement was formed in Jackson county; numbers joined the church, and we were increasing rapidly. We had made land and had given our farms teemed with plenty, and peace and happiness were enjoyed in our domestic circle and throughout our neighborhood; but as we could not associate with our neighbors who were members of the basest of men, and had fled from the face of civilization society to escape the hands of justice—in their saith-break, horse-racing, they commenced at first to ridicule, then to persecute, and finally organized mobs and burned our houses. We were whipped many of our brethren [Smith himself was tarred and feathered], and finally drove them from their habitations; there, houseless and homeless, contrary to law, justice, and humanity, had to wander on the bleak prairies till the children left their mother. The date of this event is the month of November (1833)."

The government, he says, winked at these proceedings, and "the result was, that a great many of them died; many children were left orphans; widows, widows, and husbands, widowed in the very act of possession of the mob, many thousands of cattle, sheep, hogs, and crows; and in the household, store goods, and printing-presses were broken, taken, or otherwise destroyed. These outrages proceeded in a manner which the more scandalous practices of the Mormonites—practices almost perfectly analogous to those formerly charged upon the Anabaptists and other new sects, and in all probability with no more foundation in truth. Driven from Jackson, the Mormonites settled in Clay county, where they remained three years, when being again threatened with violence, they removed to Caldwell and Davies counties. Here their numbers rapidly increased. They formed three extensive settlements, established a bank, and appeared to be in a most flourishing condition. But again various troubles fell upon them. The bank failed, and Smith was obliged to conceal himself. Their old persecutors roused the popular feeling against them, and finally, by an extraordinary order, issued by the governor of Missouri, the Mormonites were ejected from their homes, plundered of their goods, and rejected, the women especially, to the most frightful attentions. Being thus expelled from Missouri, they settled in Illinois, where they lived to the very last with great kindness. An admirable site having been purchased by them on the Mississippi, at the head of the Des Moines Rapid; they "in the fall of 1839" laid the foundations of their famous city of Nauvoo, or 'the Beautiful,' for which the state legislature granted them in December 1840 a charter of incorporation with usual privileges. Smith dwells with great delight on this city, which he had seen rise up under his presidency from a wild tract to be a place of 1,500 well-built houses, and more than 15,000 inhabitants; all looking to him for temporal as well as spiritual blessings. Those things which he describes as provided for, was "the University of Nauvoo, where all the arts and sciences will grow with the growth, and strengthen with the strength of this beloved city of the saints of God. The grand feature of this city is the great temple, which Smith thus describes:—"The temple of God, now in the course of erection, being already raised one story, and which is 120 feet by 60 feet, of stone with polished pilasters, of an entire new order of columns, surmounted by the most perfect specimen of the temple of Solomon. The materials of worship of God, as well as unique wonder of the world, it being built by the direct revelation of Jesus Christ for the salvation of the living and the dead."

The progress of Nauvoo was even more rapid than that of any of the other settlements. It was crowded in from foreign countries as well as from different parts of America; the people were peaceful and industrious, the land was fertile, and the settlement was eminently prosperous. Dangers of...
various kinds beast Smith, but he escaped from them all. He had in 1841 been arrested on a charge of sedition, &c., but being carried before the authorities of Nauvoo, he was set at liberty. Smith was chosen as the first governor of the new city, ex-governor of Missouri, and he deemed it prudent to conceal himself for a time, but eventually surrendered, and being able to prove that he was "some hundreds of miles distant" from the scene of the attack, he was acquitted. Among the consequences there were some.createous and perilous, but they never extended widely, and were easily suppressed. With the 'gentiles' settled in Nauvoo, and whom he could not keep out, he had more trouble; and, as might have been expected, they had had little to do with the revolution of the Mormons from their former cities followed them here, and suspicion and hatred gathered about them. But Smith from the foundation of Nauvoo had been making provision against this danger. He had procured the inns, as a priest, and the latter effecting the formation of an independent civil militia, which he at once organised, and of which he constituted himself 'lieutenant-general.' He also set about consolidating his spiritual as well as civil government, and he made careful provision for an ample succession of heirs and zealous missionaries. The Book of Mormon was an historical revelation: the doctrine and discipline of the church were to be enunciated in subsequent revelations as circumstances called them forth. For the first time, therefore, a sacred book, seemingly revelation. In other words, this 'church of the latter days' was to be a theocracy, with himself as its head and inspired legislator—at once the Moses and Aaron of this new house of Israel. Nor in this capacity was he ever found wanting. He was able to the monarch of men's hearts with his needful revelation. In this manner he successively defined his own position, provided for his requirements, established his 'orders' of apostles, elders, priests, &c., in the church, and regulated all ceremonies, as well as defined its doctrines. These later revelations will all be found in the 'Doctrines and Covenants of the Church of Jesus Christ of Latter-Day Saints, selected from the Revelations of God, by Joseph Smith, President, of which there have been numerous.editings since the first appearance of the new order. However well his followers, he was sadly deficient in wariness in his dealings with the outer world. Again and again he suffered himself to come into contact with the civil authority of the state; and his impolicy led him, notwithstanding the terrible lessons he had already received, to defy the storm that was plainly gathering around him. So little did he heed the danger, that in prospect of the presidential election of 1844 he published his own 'Views of Government,' a sort of social sociology, and laid the foundations of a brotherhood, were declared to be the motive forces of just government: and he was actually put in nomination for the presidency.

But he did not live to the day of election. The storm that had been so long gathering, burst before then and swept him away in its fury. The 'gentile' residents in Nauvoo, supported as it would appear by some of the dissatised among the saints, had established an opposition newspaper, 'The Expositor,' which growing more and more bold, ventured at length to denounce the morals of the prophet as well as his system of government. The city council now interfered and condemned the newspaper to silence; upon which a mob assembled, broke into the office and destroyed the presses. The mayor and the Mormon leaders with inciting the mob to this act, and they were formally arrested, but immediately sat at liberty by the public prosecutor entering a bill of complaint, a process said to have been forced as a threat, and charged with any offense. The injured parties now carried their complaints before the governor of Illinois, who, having been long waiting, as is said, for a legal opportunity to crush the power of Smith, readily granted a warrant for his apprehension, June 34th, 1844. This is the story of his arrest, and the impulse was to put Nauvoo into a state of defence, and his militia was drawn out. But on the approach of the state troops, he offered, in order to avoid bloodshed, to surrender on condition that Governor Ford would guarantee his safety till his trial. The governor consented to this, and Smith, his brother Hyram, and some of the other leading members of the council were carried prisoners to Carthage jail. A guard small in number and purposely chosen, from among Smith's declared enemies, was set over them; but, on the 27th of June, a mob of about 200 armed ruffians broke into the jail, and firing in at the door of the room in which the brothers were confined, shot Hyram dead at once. Joseph Smith attempted to escape by the window, was knocked down, cut out, and, though his dying exclamation was said to have been "O Lord my God!" His body was given up to his friends, and buried with great solemnity.

Perhaps the death of Smith at that time did more than any other fact to cause the most conspicuous steps to be taken, to confirm and consolidate the Mormon church. Smith himself, it is evident, was becoming intoxicated with power and prosperity. He is said to have given way to lust and intemperance, and though the statement is without sufficient proof, it appears that in the report, though the extent has been no doubt greatly magnified. There is every reason to believe that he was beginning to distrust even his followers, when his murder banished all feelings but those of pity and reverence. Therefore, he was thought of only as the glorified deceased; and his followers braced their nerves to endurance by the remembrance of their master's fate and example. In Nauvoo itself the impression produced by the events was most profound. At first the popular cry was only for revenge, but their leaders exhorted them to forbearance, and succeeded in their exhortations. They then proceeded to elect a successor to Smith. Three candidates put forward their claims to the prophet's place. The choice of the council fell on Brigham Young, and his followers were ready to remove his people far beyond the farthest settlements of his countrymen, convinced now that only in a country far distant from societies living under the established forms, could the vision of the Prophet stand a chance of realization. The want of a man was not the only defect that was to be remedied. They should be un molested till they could finish and dedicate their beautiful temple; and as soon as that was accomplished, September 1844, the last band of the brethren departed from the land of their hopes to seek a new land of promise.

Shortly before Smith's death he estimated his followers at upwards of 150,000, and declared that they were to be found among almost every civilised people on the face of the earth, and that he with his sons and nephews, would proceed to the diffusion of his discipies, but that their number was very great, and that they were very widely spread, there can be little doubt. To what extent, if any, they have since increased, we need not now stay to inquire. Their present condition will be more properly noticed in another article [Utah, S. B.]. It only remains now to state their doctrines as enunciated by Smith, and this will be best done in the creed which he forwarded a few months before his death for publication under the name of the 'Latter-Day Saints'有什么意义，其目的是什么？
according to the dictates of our conscience, unmolested, and all
allowed men the same privilege, let them worship how,
where, or what they may.
We believe, being subject to kings, presidents, rulers, and
and, in obeying, honouring, and sustaining the
law.

"We believe in being honest, true, chaste, benevolent,
and in doing good to all men: indeed we may say
that a large proportion of the world's greatest
things, 'we hope all things,' we have endured very many
things, and hope to be able to endure all things. If there
is anything virtuous, lovely, or of good report, or praiseworthy,
within their

In this respect it will be seen that there is no reference to
what is now commonly regarded as the characteristic feature
of the Mormon system—polygamy, nor has it been mentioned
in connection with Smith himself. There is no doubt that
during the absence of the Prophet, and of his followers, the
charges brought against the Mormons, but the doctrine of
a plurality of wives was never openly taught until after his
death, and if he proclaimed it at all, he confined the revela-
tion to the initiated. He is said however to have "sealed"
to himself "plural wives," as the Mormon expresses it, about
two years before his death; and the privilege may have
been accorded to some of the chief of his followers. But the
doctrine in its present form is one of the developments
of the

SMITH, ADMIRAL SIR SIDNEY, was born at West-
minster in 1765, and in his twelfth year was sent as a
midshipman on board the Sandwich, Lord Rodney. At
the age of sixteen he was made lieutenant, and at nineteen post-
captain. In 1784, he was commissioned in the Swedish
fleet, and landed at Copenhagen. In 1785, he
obtained permission to offer himself as a volun-
teer to the Swedish legislature, in whose service he showed so
much

able to his investment with the order of
the sword. On the surrender of Toulon to Lord Hood,
August 1793, Captain Smith, being in the south of Europe,
unemployed, hastened thither, and offered his services, which
were accepted; and on the evacuation of the city in the
following December, the destruction of the French ships of
war, which could not be removed, and that of the powder
 magazines, was one of the most celebrated and dangerous
attempts ever attempted by him. On his return to
England he was appointed to the command of the
Diamond, with a small flotilla, charged to cruise in the
Channel. He succeeded in considerably annoying the enemy,
but in attempting to cut out a ship at Harre he was
made prisoner.

After a confinement of over two years, Captain Smith, by
the assistance of a French officer named Philippeau, made
his escape and reached England in safety. Appointed to
the command of the sloop, 60 guns, he returned to
Smyth proceeded to Constantinople, and thence to Acre,
which, as the key of Syria, was then closely invested by
Bonaparte at the head of 10,000 men. Sir Sidney, with
admirable decision and promptitude, brought two of his large
crudes to the assistance of the French, and
the same time sending his friend Colonel Philip-
peau, who was a skilful engineer, to assist in directing
the fortifications; Bonaparte made several desperate assaults
upons the place, but was on each occasion repulsed with
heavy loss, and ultimately was compelled to raise the siege
and retreat in disorder. This successful resistance was
attributed in no small degree to the gallantry and energy of
Sir Sidney Smith. In the events which followed Bonaparte's
decisive victory in 1797, Sir Sidney, with admirable
judgment, promptly chose the moment when General Kleber on whom the command of the French
army had devolved, offered to evacuate Egypt, Sir Sidney,
though without instructions, confirmed the treaty which he
made with the Turkish commander to that effect at El-Arish,
January 24, 1800. The English ministry however disapproved
his procedure, and Sir Sidney continued to participate in the
measures adopted for the expulsion of the French. In
the battle of Alexandria, in which Abercrombie was killed, Smith
was one of the heroes of the battle, and was designated
'Hero of Acre,' as he was popularly designated, was received
with great enthusiasm, and among other marks of public
approval, had the freedom of the city of London voted
along with the present of a valuable

SMITH, B.A., Lecturer, and during the
brief peace took part in the debates; but on the renewal of
war he was appointed to the Antelope, 60 guns, with
command of a flying squadron, at the head of which he displayed
his wonted activity. In 1804 he was made colonel of
marines; in 1805 rear-admiral of the blue; and in 1806
he proceeded to the Mediterranean in the Pompey, 80 guns,
with a small squadron to harass the French in Naples. He
was ordered to capture Corfu, succeeded in twice throwing succours into Gaeta, landed his men, and burned and destroyed the
battering ships of war and turned gun-boats. In 1810 he
was made vice-admiral: in 1819 he was appointed second
in command of the Mediterranean Fleet, and remained stationed
in comparative inactivity off Toulon to the end of the
war, when he was knighted K.C.B., and received a pension of
1000l. for his distinguished services. In 1821 he rose to
the rank of full admiral, and in 1830 succeeded King William IV.
as lieutenant-general of marines. He died May 26, 1841, at
Paiia, where, in consequence of pecuniary difficulties arising
out of unsuccessful trading speculations, he had been for
some years a resident.

SMYTH, WILLIAM, was born at Liverpool in 1766,
and was educated at Peterhouse, Cambridge, where he graduated
B.A., and 8th Wrangler in 1797, and M.A. in 1799. His
father, who had saved the property of his family as a
consequence of the war between England and France in
1793, he was compelled to look around for means of main-
taining himself, and accepted the office of teacher to
Thomas, the eldest son of a wealthy gentleman in
Shropshire. Of his connection with these two celebrated characters Mr. Smyth has left an interesting little 'Memoir,' printed not for sale in 1840. Mr.
Smyth had accompanied his pupil to Cambridge, and from
that time it became his settled residence. In 1806 he pub-
lished a small volume of poetry, the fourth edition of
which was issued in 1830. In 1808 he was appointed
Professor of Modern History, which secured him a moderate
income, as the salary is 400l. a year. He commenced
his lectures the same year, of which the first series comprised
two years; during that period he added to the study of the
northern nations and the

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SMOKE FISH. [Corypha.]
SNETTISHAM. [Norfolk.]
SOW-WORT. [Saxifraga.]
SNOW-BUNTING. [Emberiza.]
SNOWDROPP. [Galanthus.]
SODA ALUM. [Marmarica.]
SOLANARUM. [Solanum.]
SOLASTERIA. [Soleasterin.]

Orchelis has only a few rays covered with spine-bearing
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wants; the intermediate spaces porous; the avenues bordered by two sets of spines.

There are two species which are not uncommon on the shores of the British Islands, C. oculata and C. rosse. Solaster (Forbes) has many rays studded with knobs of spines; the avenues bordered by three sets of spines.

S. pappos, the Rosy Sun-Star, is common on the eastern coasts of Great Britain, where, on account of the number of its rays, it is called Teu-Fingers. It is of a deep red or coppery hue. It is a British species in S. endeca.

SOLDANella, a genus of plants belonging to the natural order Primulaceae. Some of the species are slightly purgative.

SOL DUTT. [WARWICKSHIRE.]

SOLITARY BIRD. [DNS.]

SOLON'S SEAL, the common name of the genus Polygonum, a genus of Plants belonging to the natural order Liliaceae, and the sub-order Asparagaceae.

Polygonum has the perianth tubular, 6-toothed, tardily deciduous; the ovary 3-celled; 3 styles ovulate; the stigma blunt, trigonous; berry with 1-seeded cells; the flowers not jointed to pedicel. There are three British species.

P. sericefolium has lanceolate shaped leaves, with an erect plait; is last placed of Grass at last. P. officinarum. Solomon's Seal, has leaves ovate-oblong, half-cloping, glabrous, stem angular; peduncles 1-2-flowered; filaments glabrous. It is the ConsolidaPolygonum of Linnæus, and is known as a man abundant, which is confounded with the following. It is only found in Scotland.

P. multiflorum has leaves ovate-oblong, half-cloping, glabrous, alternate; stem round; peduncles one or many-flowered; filaments downy. This plant is the common species of Solomon's Seal.

SOMERVILLE T. [MINERALOGY, S. 1.]

SOMMITE. [NAPOLITAN.]

SOPHIA, a lady in Belgium in European Turkey, situated on the route from Constantinople to Belgrade, about midway between Nice and Philippopolis, near the point indicated by 42° 37' N. lat., 22° 27' E. long., in a wide plain bounded by high ramifications of the Balkan, and traversed by the Iaca, a feeder of the Danube, and has about 10,000 inhabitants, the greater part of whom are Christians. It is a large place, and has a beautiful appearance from a distance, but the streets are narrow, tortuous, dirty, and lined by high mud walls, which here and there inclose good houses, but in general the houses are poorly built. It has a great number of mosques and Christian churches, which are the principal buildings in the city; there are also a large and well-frequented bazaar, public baths (which are supplied from a hot-spring), and khans. The chief industrial products are—knitted-stockings, for which the place is celebrated, hair-cloth, aniline-dyes, leather, and tobacco. Sophia was formerly the residence of a pasha and capital of an eyal of the same name, but the eyal is now named from its capital, Nissa, called by the Turks, Tsipetje. It gives title to a Greek archbishop and to a Catholic bishop, the archbishopates are honorary, the Catholic is synodal. Sophia is a place of considerable commerce. It was founded by the emperor Justinian on the site of the ancient Sardica. The only remains of antiquity are the ruins of the church founded by Justinian. Sardica is famous for the council held in it A.D. 347, which confirmed the decrees of the Pope acquitting St. Athanasius of the charges brought against him at the council of Antioch. The council of Sardica also passed twenty canons, one of which permits a bishop condemned by a general council to be restored to his bishopric. The archbishops, to the number of about eighty, withdrew from the council of Sardica to the town of Philippopolis, and held what they called the council of Sardica, in which they pronounced sentence of excommunication against Otius, St. Athanasius, and the Pope. (Frontier Lands of the Christians and Turk; L'Art de Veiyir le Dots.)

SORDALWITE. [MINERALOGY, S. 1.]

SORREL. [CUCUMA, S. 2.]

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led the attack of the left at the battle of Weissenaerberg, and repulsed a body of Austrians. His next service was in the Palatinate under General Lefebvre, whom he contrived to be removed by the post of chief of the guard. In 1794 Soult was created colonel, and was one of the most distinguished officers present at the great battle of Fléron, June 26. He displayed great skill by his dispositions in this action, and in the subsequent fighting at Darmstadt. After the battle Soult, having been wounded, was taken prisoner by the Prussians and returned as prisoner of war. He was exchanged, however, and despatched to the troops of Napoleon himself, for whom he continued to serve, and in 1807 was appointed to the staff of Napoleon, and made Chief of Staff. Soult served in the battle of Austerlitz, December 2, and, being so efficient, Napoleon thanked him on the 29th of December, and made him one of the first of living strategists. Thenceforward, and until the end of the war, he was ranked as one of the leading generals of France, to whom the greatest undertakings might be committed when Napoleon himself was elsewhere. With the fall of Napoleon, Soult retired from the active service, and after the battle of Eylau, February 8, 1807. After the battle of Jena, October 14, 1806, he defeated Marshal Kalkreuth, captured Magdeburg, and put to flight the Prussian General Bliicher and the Russian General Lestocq. Again he signalled himself at the battle of Eylau, February 6, 1807, and captured Königsberg the same year.

He had now been fifteen years in constant service in the field, and had fought under the ablest and most experienced commanders, with all of whom he had enjoyed the same confidence. He fell, however, out of grace with Napoleon, and, finding that the Marshal of Spain was not in favor, he retired to his villa on the Morvan, and much to the advantage of his health. In 1809, Napoleon, seeing the risk to which he was exposed from being intercepted and hemmed in, lost no time incommending his retreat upon Corunna. Napoleon was averse to all military action, and was unwilling to fatigue the troops under his command unnecessarily; he therefore recalled the marshal, with injunctions to pursue Sir John, and "drive the English into the sea." At the same time Marshal Ney was commanded to support the operation with the six French corps. Soult, who had been so long with the Austrians, with the anxiety so common with them to explain away any failure of the French arms, have, on this occasion severely censured Marshal Soult for inactivity and negligence, in halting at every defile to collect the sick and loiterers, by which he had delayed the whole army, and according to them, was prevented. On the other hand, the marshal always expressed his astonishment at the skillful retreat of his enemies. At length, on the 18th of January, 1809, the British army, having approached Corunna, the place intended for their disembarkation, made a stand, and a bloody engagement ensued. This action Sir John Moore was mortally wounded, but the French met with a decisive repulse. [Moors, Sir John.] The British troops effectuated their retreat by storming the town of Corunna, and it was not until the 30th that the Spanish governor capitulated.

Soon after, Marshal Soult entered the Portuguese territory with the 2nd and 5th corps; and having defeated the Portuguese troops under Romana, he advanced upon Porto, which was captured by storm on the 29th of March, 1809. Instead of marching at once upon Lisbon, the marshal lingered at Oporto, where he is said to have conceived the plan of making himself king of Portugal, and to have postponed the hereditary claims of his imperial master, while indulging this intrigue.

Meanwhile, Wellington had landed, collected his forces, and made his preparations; on the 8th of May he reached Coimbra with the English army, whilst Beresford at the head of the British cavalry, and the light infantry, and Amaranth to turn the French army. After passing the Douro with his usual boldness and promptitude, Wellington fell upon the marshal, drove him from his position, and captured his camp, his baggage, and almost all his guns. Soult then retreated upon Galicia, with a loss upon his route of 5000 men; whence, after leaving Ney, with his single corps, to defend that province, he continued his retreat to Zamora. The retreat was conducted in a manner creditable to his military talent, but he suffered his troops to commit atrocities on the helpless peasantry which have left an ineffaceable stain on his memory.

After the battle of Talavera, July 28, 1809, Soult was appointed to replace Marshal Jourdan as Major-general of the army in Spain, the chief command having fallen into the hands of King Joseph, a man without any capacity for war, but faithful and devoted to his brother's plans. On the 19th of November, 1808, he won the battle of Ocana, and, soon after resolved on an expedition against the city of Seville, one of the richest provinces in Spain. Accordingly, in January 1810, he collected a strong army, consisting of four corps, and taking his way through Andujar and Seville, appeared before Cadiz on the 6th of February; but was defeated at the battle of Albuera, on the 16th of May, 1811. He then returned to Madrid, leaving the marshal in command of the Army of the Sonth, consisting of the 1st, 4th, and 8th corps. The year 1810 was almost entirely occupied by the marshal in establishing his position in Andalusia; but the wide commanders over which his troops were dispersed, constantly
exposed them to loss in petty skirmishes with the enemy, who, supported by the strong fortress of Badajoz to fall back upon, had a great advantage over him. In the beginning of 1811, Napoleon, who felt the urgent necessity of supporting Massena in Portugal, ordered Soult to Badajoz, from which he captured the place on the 11th of March, 1811, the Prince of Essling, unable to penetrate the strong lines of Torres Vedras, had found it necessary to abandon Portugal.

The days which followed brought a brilliant line of victories that relieved the English army from one of their most formidable opponents, Lord Wellington determined to recapture Badajoz, for which purpose he despatched Beresford to invest it. The siege was opened on the 7th of May, 1811; Soult came to its relief, and with his forces in the battle of Albuera, in which he fought with consummate skill, though not with his utmost numbers he inflicted great loss upon Beresford's army—he was thoroughly defeated. The fall of Badajoz now appeared inevitable, when Napoleon, apprised of Soult's recent defeat, ordered Marshal Marmont, who had superseded Massena in the command of the army of Portugal, to push forward to his support. This movement rendered it necessary for Wellington to raise the siege on the 16th of June. However, in the following spring, encouraged by the capture of Ciudad Rodrigo, Wellington laid siege a second time to the fort of Badajoz, and—though not without terrible loss—the place was carried on the 6th of April, 1812. Soult was in consequence compelled to retreat from Seville, his rear-guard being saved by a shore-boat from the Tagus.

The subsequent defeat of Marmont at the battle of Salamanca (July 22, 1812), and the surrender of Madrid to the British general, compelled Joseph Bonaparte to withdraw both the Spanish and French forces, and Marshal Soult, at the creation of orders to join him. Accordingly, he despatched de Brevet, who marched out of Andalusia, and on the 10th of November took the command of the three combined French armies stationed on the Tagus. This junction of forces was too powerful to be attacked; Lord Wellington, therefore fell back upon Ciudad Rodrigo, with a heavy loss of troops on his route, and went into winter quarters. After his departure from the rich province of Andalusia, which he had occupied for nearly three years, the strongest charges were brought against Marshal Soult for the cruel extortion levied on the people by himself and his agents, and his shameless and unbridled robbery of pictures and articles of value. The reports of military men of every army engaged in the Peninsula war have fully corroborated the charges; while the enormous wealth which he ostentatiously displayed after the peace seemed to indicate that he did not feel the disgrace his atrocious conduct had drawn upon his name. For a few months during the year 1813, Soult was employed in the German campaigns, but being dissatisfied with the command of his troops, he requested the king to give him a post in the south-west. The king granted his request; but in order to mark his appreciation of the services of the marshal, Louis-Philippe re-established in his favour the ancient and disused dignity of Marshal-General of France, which had not been borne by any officer since the death of Marshal Turenne. From that time the marshal went to live in retirement, to which he confined himself more closely still after the revolution of February 1848. His health and strength had been undermined; the marshals grew worse during the year 1851, and breathed his last at the castle of Soult-Berg, on the 29th of November in that year. After his death his splendid gallery of Spanish pictures collected by him during his Spanish campaigns was sold by the Government; and it is ascertained that the best of these pictures are now in the Imperial Galleries of France. The Mémoires du Marshal General Soult, due de Dalmatie, published by ses fils, 1ère partie. Histoire des Guerres de Rvolution, appeared in three tomes. 8vo, with an Appen. Paris, 1833.

SOUTH AUSTRALIA. Under this head, in Supplement 1, an account of the geographical features of the colony was given. It has risen since to greater importance, and is better known. We therefore add the following particulars:

The climate of South Australia is one of the finest in the world, resembling that of the south of Italy. The atmosphere is generally clear and dry; and the grass is green and thriving, of the variety and brilliancy of its colours. There are no prevalent diseases. On entering the country some are attacked with dysentery, which with a little care may be avoided. Adelaide has been occasionally visited with influenza; and at particular seasons the sheep are beset with an epidemic of ophthalmia, which is rather a swelling of the eyelids, caused by a small insect. The seasons are divided into dry and wet. The dry season begins at the end of August and continues to the middle of November. At this time, generally, the days are warm or hot, and the nights cold, a difference of temperature corresponding to our June and July, the heat is very great, and the ground so arid that the least breeze raises clouds of dust. Occasionally in summer a hot wind from the north blows over the plains, and compels all to seek shelter. In winter a cloud of cold, heavy rain comes down from the south-west. The thermometer ranges as high as 115° Fahr. Its highest range in 1856 was 106°; its lowest,
During the summer period, from the end of March to August, it rains frequently and sometimes very heavily. During this period the earth is covered with the richest verdure, and the weather is so genial that the approach of summer is scarcely perceptible. In summer the grama grass grows luxuriantly and is so plentiful and tender that it is broken when trampled on; but the ground is as rapidly clothed with fresh pasture by the showers which fall at no great intervals. The long droughts, with which New South Wales is periodically visited, and the large extent of its fertile pasturage, preserve the species in a state of health and vigour, and they are found in considerable numbers on Kangaroo Island. For several years flocks have appeared in great numbers, and caused much damage to gardens and young crops in the district around Adelaide. Birds are numerous, and great numbers of quails and parrots are commonly seen. There are several kinds of snakes and lizards among the latter the iguanas, which is eaten; among shell-fish, oysters and periwinkles are plentiful. Turkeys and imported horses from Tasmania and New South Wales, and pouls from the island of Timor in the Indian Archipelago; cattle and sheep from the Cape, Tasmania, New South Wales, and Victoria; hogs from New Zealand. Fowls are common, both the common species and the larger one from the countries of the Malays. The kangaroo-dog is a valuable cross-bred of the dog-bulldog and greyhound, and is used for chasing the emus and kangaroos.

The woods of South Australia contain many large trees, of which the stringy bark, the hoop pine, and the red gum, with other genera of the Eucalyptus, are the most useful, their timber serving for building and fencing, for the construction of carts and ploughs, and the manufacture of agricultural implements; but timber for finer purposes is imported. There are several species of trees which yield large crops of grain which are successfully cultivated: maize grows well, and also potatoes. Melons, water-melons, pumpkins, and cucumbers attain an uncommon size, as do also cauliflower,

Onions are cultivated, to a great extent in Kangaroo Island. Every approved variety of grape is grown. No edible is indigenous, except some berries, which are eaten by the natives. Fruit-trees have been extensively introduced. At Adelaide a prize was awarded in 1851 for a collection of sixty varieties of apples grown about ten miles from the town. A few gardens have been established, and the oranges and limes and olives and mulberries, are cultivated to some extent. Every approved variety of grape is grown.

South Australia is rich in minerals. Iron-ore is found in many places, especially in the deserts. Copper-ore is very widely distributed in great abundance, and of the richest quality. Lead also; exists, in considerable quantity, and some gold has been found. Salt occurs in many places. Twelve copper-mines were in operation in 1826. These are --the Burra-Darra mine, 90 miles N. by E. from midland station, N. E. by E. Karkutie mines, 76 miles N. by W.; Worthing mine, 14 miles S.S.W.; Perseverance mine, 12 miles N.E. by E., where parties were engaged digging for gold on lodes; Theel mine, 25 miles N.E. by E., the Consolidated mines in Barossa and Lyndoch Valley, 33 miles E. by N.; the Kanyakoo, Bremar, Wheal Mary, Wheal Maria, and Wheal Friendship mines, all in a group about 25 miles S.S.E. from Adelaide. The ore of the Burra-Darra mine is peculiarly rich. It contains 70 per cent. of metal, in the form of a pure oxide requiring no flux to smelt it, the heat of a blacksmith's forge sufficient to reduce it. The lode is 17 feet wide, of great extent, and is carried up in steps, in lodes, and is divided from the stone, in veins, into masses of about 20,000 tons of copper ore, valued at 200 l. per ton. The lead mines are Glen Osmond and Wheal Watkins mines, about six miles south from Adelaide, and the Wheal Gawler and Yatagalonga mines, the first two yielding 76 per cent. of metallic.

The natives of South Australia, like those of New South Wales, belong to that race which is called Negro Australian. They have not yet attained an equal degree of civilization as the natives of the northern part of the eastern coast, but measures have been adopted for their improvement, and a prospect of success. There are schools at Adelaide and Port Lincoln for the education of the children. Connected with the latter is a training institution under the superintendence of Archdeacon Hare, in which the youths, after leaving school, are kept separate from the tribe, and instructed in the Christian religion and in some industrial pursuit. A number of youths are employed on stockholders' stations along the Murray. Though it appears certain that all the natives of the southern and eastern coast of Australia speak the same language, a marked difference exists in the dialects spoken in different parts. Various dialects are used within the territories of South Australia: one is spoken by the few isolated families who are preserved on the coast of the Gulf of Carpentaria; one is the language of the tribes inhabiting the vicinity of Adelaide, and the tribes along the banks of the Murray below the junction of the Darling, have been found to use four different dialects, of which three of which are unintelligible to natives from the neighbourhood of Lake Albert, and the one employed in the south-west of the colony is generally peaceable and inoffensive.

The settled parts of the colony have been distributed into the counties of Flinders, Sydney, Gawler, Light, Eyre, Adelaide, Sturt, Hindmarsh, Grey, Robe, Russell, all lying between the east coast of the Gulf of Carpentaria and the county of Flinders on the south-west coast of Spencer Gulf. A township has been laid out at Port Wakefield, at the head of the gulf of St. Vincent, where a considerable quantity of wood has been shipped for Sasseena. Roads and bridges have been liberally provided for as settlements have been formed.

The population of South Australia in 1854 was 97,387. The government of the colony is vested in a lieutenant-governor, an executive council, and a legislative council. The executive council consists of the governor, the colonial secretary, the advocate-general, and the surveyor-general. The legislative council, which was instituted in 1851, is the present of a small number, and the Imperial Parliament, passed in August, 1850, consists of 34 members, divided into the crown, and 16 are elected by 10c. householders and the possessors of freehold property of the value of 100l. sterling, in the 16 districts into which the colony is divided for the purposes of the local government. There are no municipalities in the colony, and the greater part of which is derived from the duties of 1s. per gallon on wines, and 10s. per gallon on spirits. There are no differential duties between British and foreign goods; but an 'ad valorem' duty of five per cent., or an equivalent rated duty, is charged on all imports except wines and spirits. The general colonial revenues in 1852 was 109,355l., the expenditure was 88,338l.; for 1855 the revenue had risen to 504,300l., and the expenditure to 510,237l., and of a total of 173,376l. being a small balance during the year on streets, roads, and harbours. The land fund revenue realised 223,746l. for 171,610 acres of land. The total exports in 1852, exclusive of bullion and coins, amounted to 795,871l.; the imports were 938,971l. In 1854 the imports amounted to 3,064,436l., but decreased considerably in 1855; while the exports had increased from 833,104l. in 1854 to 839,915l. in 1855, exclusive of gold, which in 1854 amounted to nearly half a million. The export and import trade show a considerable increase.

The government of education in the colony, an inspector of schools has been appointed. Schoolmasters obtain an annual grant of 20l. for the first 30 scholars, and 1l. for each additional scholar, the aid however in no case rising above 60s. The same amount is paid for each schoolmaster's residence. A school fund, amounting to 1,000l. was raised by subscription in aid of education is 1853, was 69, with about 3200 scholars. The amount paid to teachers during the year was about 3100l.

In 1850 there were about 180 places of worship in the colony. The ministers of religion were 17 of the Church of England, under the superintendence of the Bishop of Ade-
SOUTHERNWOOD.

"A"., Caroline Ann, (better known as Caroline Bouver), the second wife of Robert Southey, was the only child of Captain Charles Bowles, of Buckland, near Lymeington, Hampshire, where she was born December 6, 1787, and where she spent the whole of her days, with the exception of a few years, spent in the colonies. Her home was in the suburbs of the city, and she was known as "Caroline Bouver," or "Mrs. Southey," as she was the wife of Robert Southey, the poet. Her life was spent in quiet seclusion, and she died in 1861.

THE BURRA-BURRA AND OTHER COPPER MINES IN SOUTH AUSTRALIA.

The Burra-Burra and other copper mines in South Australia have been extensively worked, and are still in operation. The mines are located in the extensive copper belts of the Flinders Ranges, and are situated about 80 miles from Adelaide. The copper is of high grade, and the ore is easily worked. The mines are operated by a number of companies, and the output of copper is considerable. The copper is exported to many countries, and is used in various industries.

SOUTH AUSTRALIA.

The South Australian government has been in existence since 1851, and is the oldest state government in Australia. It is a representative government, and is governed by a council of ministers. The capital of the state is Adelaide, which is situated on the coast, and is a seaport city. The state is divided into a number of counties, and is bounded on the north by South Australia, on the east by Bass Strait, and on the west by the Great Sandy Desert. The state is also bounded by the Indian Ocean to the south.

SOUTHERMILTON.

A town in the county of Devonshire, England, and the seat of the See of Exeter. The town is situated on the river Tamar, and is a market town. The town is surrounded by a number of small villages, and is a center of agriculture and commerce. The town is governed by a council of aldermen, and is represented in Parliament by two members.

THE BURRA-BURRA AND OTHER COPPER MINES IN SOUTH AUSTRALIA.

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her husband's letters, which have since been edited by Mr. Warter. The poetry of Caroline Bowles is of a kind that will always give pleasure to persons of a reflective turn of mind, but it is not likely to deserve tender, graceful, and, though somewhat melancholy, pervaded by a fine moral tone; but it is diffuse, and wasting in strength of thought and passion.

SOUDET, EMILIE, one of the most able writers of the present day, was born at Morlaix, in Brittany, on the 15th of April 1806. His father was an engineer officer employed in repairing the roads and bridges of his district. Educated at the college of Pontivy until he had reached the age of 15, he began to be decided on a taste for literature. But his father's death in 1823 induced him to select the bar as his profession. He therefore studied the law, and in 1827 was formally received as an advocate at Rennes. He soon however gave weary of waiting for practice, and proceeded to Paris, with a strong determination of setting up as an author. His first efforts in this way were not encouraging. Having written a drama, the 'Siege de Maloslong,' it remained unnoticed at the theatres until M. Alexandre Donat, a Breton like himself, and already known as a successful dramatist, supported him with his interest. After this his tragedy was read, accepted at the Théâtre Français, and put into the prompter's book. But then came the 'censure' with its pruning knife, and such was the moral that soon after he had written it he had before appraised it. Thus disappointed of his hopes, he returned to his family, and being left without resources, accepted a situation as shopman with M. Mellinet, a bookseller at Nantes. In this situation he was living when the Jersey painter, Charles X., gave so much stimulus to the young generation.

He began in 1830 to write for the provincial press, and in 1832 was appointed managing editor to a liberal journal published at Nantes. While living with M. Mellinet, Émile Souvestre was frequently noticed by the customers who frequented the library, for his unobtrusive good sense, and one of these, the deputy Léminais, a gentleman devoted to the reform of national education, conceived a friendship for him. This deputy was a Breton, and was naturally flavoured with the national interest in the same object, and having founded a school at Nantes for the illustration of his new plan, he entrusted the management of it to young Souvestre, and another youthful reformer, M. Papot, under whom its success was from the first decided. In 1835 M. Souvestre was made régent de rhétorique at the college of Malhonne, in Alaise; he did not however continue many months in this situation.

For several years he had been quietly collecting materials to produce a work on his own province, to which he was extremely attached. This he did in 1836, under the title of 'Les Derniers Bretons,' a book which at once established his name. It is one of the best descriptions of Britany, full of vivid illustration and supported by the customs, manners, and literature of the 'Wales of France.' His 'Échelle des Femmes' appeared at the same time, and was likewise successful. Encouraged by this change of fortune, Émile Souvestre returned to Paris to fix himself there. He was then thirty, and his future lot was decided. For the next twelve years, 1836-48, he took a prominent part in the rédaction of the 'Réve de Paris,' and the 'Réve de Deux Mondes;' he also contributed many notices and articles to 'Le Temps,' 'La République,' 'Le National,' the 'Scole,' and the 'Journal du Commerce.' His style is very pleasant, his matter thoughtful and instructive. His articles, tales, and books have none of the levity, or persiflage, so lamentably common in too many of his contrymen in the present day; they may be taken up with full reliance on their taste and tendency. Among his numerous writings may be cited: his 'Voyage dans le Finistére,' 'La Maison Rouge,' 'Le Mat de Coqagne,' 'Pierre et Jean,' and 'Les Confessions d'un Ouvrier.' The last is a story of a thousand, full of maxims of the soundest character, especially as relates to the industrial classes. He has also produced several successful dramatic pieces, amongst others: 'Le Fil de tout le Monde,' 'Le Riche et le Pauvre,' 'Henri Lamennais,' 'Aine de Cadet,' 'Un Misantheme,' 'Un Messager de l'Amour,' 'Un Enfant de Paris.' He is also the author of a good history of the Revolution of 1848.

In 1848, Émile Souvestre, who never lost sight of the principle of educational reform, was appointed by M. Carnot, then minister of public instruction, a lecturer in one of the schools established for the civil service. He likewise gave gratuitous lectures in the evenings to large audiences, consisting of working men and their families. These lectures were well calculated to produce a beneficial effect, and were always crowded.

In 1853 he spent the summer months in lecturing in the principal towns in Switzerland. These lectures were also very successful. He seemed to have found a new vocation, and had begun to diffuse new and more rational notions on a class, who do not always think for themselves, when his health gave way, and death put an end to his useful labours, on the 6th of July 1854. Having married a second time, he left behind him a widow and three daughters.

SOWERBY, GEORGE BRETTINGHAM, second son of James Sowerby, one of a numerous family distinguished as naturalists, or natural history artists, was born at Lambeth on the 12th of August 1786, and died on the 36th of July 1854. He studied natural history with more success than his elder brother, perhaps on account of his not being so good an artist.

In early life he was attached to the study of Entomology, and assisted his father in those departments of his labours where a knowledge of insects was required. On marrying however he gave up his Entomology, and commenced business as a dealer in natural history objects, and visited the Continent of Europe for the purpose of obtaining specimens. He bought the celebrated Tankerville collection of shells, for which he gave six thousand pounds. He also bought several other large collections. His knowledge of the forms of shells was very extensive, and he projected and published a great work entitled 'The Genera of Recent and Fossil Shells.' This was published from 1820 to 1834. His father and brother executed the plates, and he wrote the descriptions. His papers on various species of Mollusca are very numerous, and were published in the 'Zoological Journal,' the 'Proceedings of the Zoological Society,' the 'Magazine of Natural History,' and the 'Reports of the British Association.' A list of these papers, upwards of forty in number, is given in Agassiz's and Strickland's Bibliography of Zoology, published by the Ray Society. Besides these papers and the work on the genera of shells he published several volumes for which he was much esteemed. These should be mentioned the Catalogue of the collection of the late Earl of Tankerville, 'Species Conchyliorum, or concise original Descriptions and Observations of all the Species of recent Shells with their Varieties,' London, 1830. 'Cockeyological Illustrations, or coloured figures of all the hitherto unfigured recent Shells, with their Varieties,' London, 1832-35. 'Thesaurus Conchyliorum, or Figures and Descriptions of Shells,' London, 1842. He was a Fellow of the Linnean Society.

SOWERBY, CHARLES EDWARD, third son of James Sowerby, was born on Feb. 1st, 1795, and died in June 1842. He assisted first his father and afterwards his brother James de Carle in their natural history publications till 1831, after which he spent many years in the English Colonies. In 1831 he commenced the publication of a second edition on small paper, with large additions. This work has been reprinted by his son, John Edward Sowerby.

SPAN. Since our previous account very material alterations have taken place, which we shall briefly indicate. The first is the sub-division of the old provinces for administrative purposes, which we subjoin, with the population in 1849, the latest return available; but by a return not yet published, the total population it seems amounts to about 17,000,000.

Area and Population of Political Divisions.

<table>
<thead>
<tr>
<th>Old Provinces</th>
<th>Modern Provinces</th>
<th>Area in Sq. Miles</th>
<th>Population in 1849</th>
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</thead>
<tbody>
<tr>
<td>Zagorza</td>
<td>Zagar</td>
<td>5,254</td>
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<tr>
<td>Hunska</td>
<td>Hunska</td>
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<tr>
<td>Orleans</td>
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<tr>
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<td>9,225</td>
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The table below shows the area in square miles and population in 1840 for various provinces in Spain. The data is accompanied by comments on the commerce and manufactures, the geographical position, natural productions, and the effect of war on these areas.

<table>
<thead>
<tr>
<th>Province</th>
<th>Area in Sq. Miles</th>
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</tr>
<tr>
<td>Palencia</td>
<td>5,663</td>
<td>180,000</td>
</tr>
<tr>
<td>Murcia</td>
<td>15,997</td>
<td>1,759,029</td>
</tr>
<tr>
<td>Múrcia</td>
<td>9,664</td>
<td>307,410</td>
</tr>
<tr>
<td>Albacete</td>
<td>420,000</td>
<td>512,000</td>
</tr>
<tr>
<td>Valencia</td>
<td>8,896</td>
<td>385,446</td>
</tr>
<tr>
<td>Alicante</td>
<td>135,462</td>
<td>915,590</td>
</tr>
<tr>
<td>Castellón</td>
<td>9,664</td>
<td>307,410</td>
</tr>
<tr>
<td>Tarragona</td>
<td>7,683</td>
<td>1,110,960</td>
</tr>
<tr>
<td>Total</td>
<td>184,072</td>
<td>13,905,000</td>
</tr>
<tr>
<td>Baleares Islands</td>
<td>1,757</td>
<td>253,000</td>
</tr>
<tr>
<td>Canaries Islands</td>
<td>3,240</td>
<td>277,217</td>
</tr>
</tbody>
</table>

Commerce and Manufactures—Spain, from the extent of its coast-line, its large ports of Cadiz, Cartagena, and Ferrol, the number of its smaller barbers, its geographical position, and its abundance of natural productions, possesses very great commercial advantages, but those advantages have been diminished, and in a great measure destroyed, by the restrictive laws of the government. Smuggling to an enormous extent is carried on almost everywhere along the coast, especially at and near Gibraltar, and also from France, across the Pyrenees, and from Portugal across the frontier. The articles smuggled through Gibraltar consist of cloth, sugars, muslins, thread, stockings, and the like, and tobacco to a large extent. The total import into Spain during 1849 amounted to 857,171,795 reals (about 6,160,000 l.). Of course these are the registered imports. The amount of goods smuggled into the country cannot be estimated. The exports during the same year amounted to 476,129,823 reals (about 6,000,000 l.). The imports consist of colonial produce, dried fish and salted provisions, cotton and woollen goods, cutlery, glass, butter, and cheese. The exports consist of wool, wines, brandy, oil, fruits, chestnuts and nuts, cork, quicksilver, hides, lead, and salt. The exports of silk and manufactured goods. Of late years a large amount of wheat and flour has been exported from the northern provinces, chiefly to Cuba and Brazil. The manufacturing industry, formerly considerable, has greatly declined; and the grape-vine disease (oidium) has very materially lessened their manufacture and exportation of wine. The government has still manufactures of tobacco, saltpetre, gunpowder, cannon, fire-arms, and porcelian, but they are all in a decayed state except the manufacture of cigars at Seville. Other manufactures are silks, coarse cot开关, and woollens, and leather. Cutlery and iron-ware are made to some extent in the Basque Provinces and Asturias.

Roads, Canals, and Railways.—The public roads in Spain, except those belonging to the capital and going to market, are not bad. Madrid through Leon to Oviedo and the coast, are amongst the worst in Europe. The only canal of importance is the Imperial Canal, commenced by Charles V., extending along the southern bank of the Ebro. There are three or four smaller canals in the province of Castile and its territory, none of which was completed in January 1858, are—from Barcelona to Arenis del Mar, 23 miles; from Barcelona to Granollers, 19 miles; from Barcelona to Martorell, about 20 miles; from Barcelona to Tarrasa, 25 miles; from Valencia to Alcudia, 39 miles; from Valencia to Alcoy, 3 miles; from Madrid to Albacete, 173 miles; Reina to Alar del Rey, 32 miles.

Revenue.—The budget proposed for 1857 amounted to 20,030,000 l.; the ordinary receipts were estimated at 17,681,000 l., leaving a deficiency to be supplied of 2,350,000 l. The amount of the public debt in November 1856 was 141,200,000 l., on which the interest payable was 2,277,000 l., in addition to a loan for 8,330,000 l. recently contracted for.

The army and navy are given under MILITARY AND NAVAL FORCES, &c.

Religion and Education.—The established religion is the Roman Catholic, and no other is allowed in the Spanish dominions. The crown presents the archbishops and bishops, who are confirmed by the Pope. The wealth of the church was at one time immense. After the suppression of the nunneries and monastic orders were suppressed, and the convents and the lands belonging to them were sold; but the convents of nuns were suffered to remain till the death of the then occupants. A laicization of the estates in 1835 for the benefit of the church-property, and its conversion to secular uses; which law was revoked, at least so far as the property nunnels, in 1857; and an indemnity to the clergy of upwards of 2,500,000 l. has been granted to the Cortes, but has not yet (May, 1858) been adopted.

Education is very little diffused. The lower classes receive little or no instruction, except in the principal cities, where infant-schools have of late years been established. The children of the upper classes are mostly educated in private schools and universities. The universities and monasteries, and of great reputation, are now reduced to about 14, and those are attended by only a comparatively small number of students in theology, law, and medicine. There are, however, several medical and literary societies in Madrid, Sevilla, and other large cities.

History.—After the queen-mother, Christina, had been appointed queen-regent (Reina Gobernadora), Don Carlos, the brother of Fernando VII., laid claim to the throne on the ground that the Salic law female line was ineligible. A civil war ensued, which lasted till September, 1840, when the partisans of Don Carlos were finally defeated, and the sovereignty of Isabella established. Early in 1854, in consequence of the arbitrary and unconstitutional measures of the Spanish government, insurrections occurred in Barcelona and other places. On the 22nd
of February the whole kingdom was declared in a state of siege. On the 15th of July the city and garrison of Paris were carried by storm. The streets were barricaded, and the people fought against the soldiers till July 17, when the ministry fled, the soldiers gave up the contest, and a National Guard was formed. The above events were not the end, but the beginning of a revolution. The constitution of the government was re-established; and the queen-mother was banished from the kingdom, August 28, 1684.

In June, 1686, a revolution took place, and General O'Donnell was killed. The force of arms. He was succeeded by Marshal Narvaez in October. Narvaez was dismissed in the following year, and was succeeded by M. Isturitz, as prime minister, but the government is yet in a very unsettled state.

Spanish.


Species of plants. All the individual forms of plants, as well as animals, that occur on the globe, may be collected into groups resembling each other, and these groups are called species. A species has been defined to be "a combination of individuals alike in all their parts;" "a species..." a collection of individuals which will breed together and produce fertile offspring." De Candolle says, a species is a collection of all the individuals which resemble each other more than they resemble anything else, which can by nurture and their future alsoreproduce themselves, by generation, in such a manner that we may from analogy suppose them all sprung from one single individual." However clear such a definition may be, it would assist a botanist only in a very limited degree in determining whether a new plant should be looked upon as a new species. If there were perfect structural identity between two individuals of the same species, or if we could ascertain, on the physiological ground, that the individuals after fertilization reproduced similar individuals, there would be no more to be done than to name the new one. But perfect structural identity does not exist, and the physiological test cannot be always applied, and hence the difficulty of determining what is really a species. From this same source go so far as to deny the existence of species altogether, and assert that the supposed distinctions between plants are altogether arbitrary and imaginary. This notion is however altogether upset by the well-known fact of plants maintaining for centuries the same structural character.

De Candolle says, "one acquires the idea that the variations multiplication of species, that some fixed rules cannot be laid down for their formation, it does not appear at present that anything more than general rules can be given, and that much must depend on the judgment and experience of the botanist." As a general rule species are not distinguished by differences in the internal organisation, such differences being left for the higher divisions into genera, orders, and classes; but by those superficial and external differences which are independent of internal structure. Of these may be named duration, dimension, surface, form, division, numerical proportion, and colour. The value of each of these points varies according to circumstances, and in proportion to the knowledge of the observer will be the skill with which he selects them for distinguishing species. The duration of a plant is a point of great importance, as in no instance do we find, unless from change of climate, plants of the same species differing in being annual, biennial, &c. Dimension, however, is a subject of great importance in cases of extreme consideration in extreme cases. Differences of surfaces, depending on structural peculiarities, are of importance; smoothness, roughness from tubercles, and the existence of the presence or absence of symmetrical hairs on the surface of leaves is a point that may mostly be disregarded; they are of more importance on other parts. The form of parts is only of importance when it is the consequence of anatomical difference. The division of organs is not of much importance where it depends on the degree of the laceration of the parenchyma. The union or non-union of contiguous organs, as the parts of the calyx, corolla, &c., is of the greatest value, being mostly uniform in all the individuals of the same species. The

numeral proportion of the parts of a plant is of value in proportion to the small number of parts or organs; the greater the number, the more subject it is to variation. Differences in colour, odor, or taste, are little to be relied on.

These departures from identity of structure, which are considered insufficient to constitute a species, are called varieties, and the points of structure that should constitute a species are called a VARIABLE. Species is a term which is no longer used in botany, and it is no longer the term for another to author and reductie the species of another to mere varieties. Thus, Borrer has made 71 species of Stink, but Koch has reduced them to 29, and the species of Stink are of vast number, and are the result of the influence of climate, soil, elevation, &c., on species, would save much trouble and vexation on this point. De Candolle has elegantly summed up the influence of these agents on plants:— "Let us suppose," he says, "what really happens, that the seeds of plants are scattered at hbird on the surface of the earth; and, to speak more correctly, by causes that have no necessary connection with the existence of those plants; such seeds will find themselves in an infinite variety of situations; some which have fallen in soil that is too tenacious or too loose, too very or too wet, too hot or too cold, do not grow, and are soon destroyed. But between these extremes some will succeed, although it may be under very different circumstances. Thus, for instance, if the place were not light, the plant will be half blanched, which will be indicated by its paleness and feebleness, or by being spotted, or by the diminution or even loss of its hairs; if the light is too bright, the plant will be stronger, smaller, more deeply coloured, harder, and more velvety than usual. Temp-erature is also a cause of variation, and in a cold climate the same plants are smaller and weaker than ordinary, the color of the flowers and fruit is paler, the wood worse ripened, their leaves more deciduous, their fruit often abortive, and the sap destined to nourish it throwing itself into the formation and development of the leaves; and in water it will lose all their hairs, a greater number to the capillary segments so as to look like hairy roots, their stems and flower-stalks lengthen to reach the surface of the water, and these different effects are further variable as the water is still or agitated, clear or turbid, pure or mixed with heterogeneous substances; the varieties of Ranunculus aquatilis offer a remarkable example of this. If, on the other hand, a plant accustomed to water is found to live in a drier soil, it becomes covered with hairs, remains smaller than usual, and in other cases it will become large, fleshy, and fully formed; if it contains a great quantity of carbon, the colours of the flower are often altered, as those of the Hydranga into blue, and of the Pink into violet; if it is charged with salt, or if the plant is within the salt of the earth, even brought through the atmosphere, we usually find the leaves more fleshy and more glaucous, as in Loctes corniculatis. All these different circumstances, combined with each other in nature, are fertile causers of varieties, which are still further multiplied by cultivation."

Speedwell. [VERONICA.]

Sphenops. [SCHINODENDRUM.

Sphenostilbite. [Mineralogy, S. 11.

Spiders. [Aranthemum, S. 1.

Spontini, Gaspard. A famous Italian dramatic composer, born at Jesi, in the Roman States, in the year 1775. After studying the principles of music under Padre Martini at Bologna, he entered, at the age of thirteen, the Conservatorium at Naples. His name became known through his school of great renown. At seventeen he composed his first, "Pentigilli delle Donne," which spread his name over Italy, and led to the favourable reception of a long series of dramatic productions. He visited Paris in 1804, and from that time became known and popular in all the principal cities of Europe; he enriched his principal works, "La Vestale," "Olympia," and "Fernand Cortez," having been composed for and produced at the Académie Royale de Musique. Of these works "La Vestale" acquired the greatest celebrity. Having been adapted both to the Italian and the German stage, it was
performed in every great musical theatre in Europe, and for a time had almost as much popularity as the works of Rossini himself. Spontini passed many years of the latter period of his life at Berlin, as director of the Prussian opera, and held this office at the time of his death, January 21, 1851.

SPURGE LAUREL. [Daphne.]

STAG-BEETLES. [Lucanidae, s. 1.]

STAIRS. [etc.]

STALEYBRIDGE, Lancashire, a market-town in the parish of Ashton-under-Lyne, is situated chiefly on the right bank of the river Tame, in 53° 30' N. lat., 2° 4' W. long., distant 8 miles E. by N. from Manchester, 16 miles N.W. by N. from London, and 193 miles by the London and North-Western railway via Trent Valley. The population of the town in 1851 was 20,786. The living is a perpetual curacy in the archdeaconry and diocese of Manchester. Stalybridge owes its importance chiefly to the cotton manufacture. Woollen-cloth is manufactured to some extent; there are also brass and iron foundries, machine-making factories, brickfields, collieries, stone-quarries, and cornmills. The parochial chapel is an octagonal structure occupying an elevated site, and there are two distinct churches, chapels for Wesleyan, Primitive, New Connexion and Association Methodists, and for Independents, Baptists, and Roman Catholics; National, British, and Roman Catholic Schools, and also a dispensary, and savings bank. Saturday is the market-day; fairs are held on Easter Monday and November 5th.

STAMP ACTS. See 17 & 18 Vict., c. 83; 18 & 19 Vict., c. 30; 18 & 19 Vict., c. 82; 18 & 19 Vict. c. 27; 18 & 19 Vict. c. 30 and 18 & 30 Vict.

STAMP DUTIES. That the relaxing of a heavy tax, while it confers great advantages on the public, does not always involve a loss of revenue, has been strikingly shown in the example of the postage rates, as well as in many others, of which the Stamp Duties form one. In 1850 and 1854 great alterations and reductions were made by the 13 & 14 Vict., cap. 97, the 16 & 17 Vict., caps. 59 & 60, and the 17 & 18 Vict., cap. 53. That the acts were altogether a great boon to professional men, and to the public at large, is plain from the returns which there are not two opinions. The effect upon the revenue will be seen from the following figures:

In the year ending Jan. 5, 1850, the sum produced by the Stamp Duties was £5,867,548
In the year ending March 31, 1858... £7,572,509

It must, however, be taken into account that the Succession Duty on real estates was passed in 1853. But in 1858 the stamp duties yielded £6,763,259; and the penny receipt duty has come into operation since.

In pointing out the difference between the former and the new duties, the ad valorem duties first claim attention.

Conversion of the Shilling into the Dollar.—These duties show a considerable reduction in all purchases for sums not exceeding 500,000/. The highest ad valorem duty under the late law was 100/, there being no increase on sums exceeding 100,000/. The duty is now one uniform rate of 10/ per cent., without limit; which, speaking in general terms, may be said to be about half the amount of the former duty on sums from 500/ to 100,000/. That duty was not a uniform rate, as at present, but a fixed amount on all sums between those specified in the same stamping, some at more or less than 1/ per cent., as the purchase money approximated to the higher or lower amount in each step; on the mean sum it was precisely that rate. But on sums under 500/ the rate was, for the most part, much higher, being as much as 3/ per cent. on the mean sum under 20/; 3/ per cent. on that under 50/, and 1/ 10s. under 150. On purchases of small properties, therefore, the advantage is very great; and, referring to these, the justice and propriety of the language of duties will be more apparent. In giving a comparative statement of the two duties a difficulty arises from the difference in the language of the two acts imposing them, in expressing the turning point; in the new act the words "exceeding" and "not exceeding" being substituted for "amounting to" and "not amounting to".

The omission to charge the ad valorem duty on conveyances where the consideration was stock, whether in the funds, or of any company, is supplied.

The following table will exhibit a glance at the difference between the old and the new duties in all cases of sales for sums not exceeding 1000/.

<table>
<thead>
<tr>
<th>£</th>
<th>Old Duties.</th>
<th>New Duties.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amounting to 90 and not exceeding 50</td>
<td>10/6</td>
<td>1/6</td>
</tr>
<tr>
<td>Amounting to 50 and not exceeding 30</td>
<td>10/6</td>
<td>1/6</td>
</tr>
<tr>
<td>Amounting to 20 and not exceeding 10</td>
<td>3/6</td>
<td>3/6</td>
</tr>
<tr>
<td>Amounting to 10 and not exceeding 5</td>
<td>2/6</td>
<td>2/6</td>
</tr>
<tr>
<td>Amounting to 5 and not exceeding 2</td>
<td>1/6</td>
<td>1/6</td>
</tr>
<tr>
<td>Amounting to 2</td>
<td>6d.</td>
<td>6d.</td>
</tr>
<tr>
<td>Exceeding 30</td>
<td>7/6</td>
<td>7/6</td>
</tr>
<tr>
<td>Exceeding 15</td>
<td>4/6</td>
<td>4/6</td>
</tr>
<tr>
<td>Exceeding 10</td>
<td>3/6</td>
<td>3/6</td>
</tr>
<tr>
<td>Exceeding 5</td>
<td>2/6</td>
<td>2/6</td>
</tr>
<tr>
<td>Exceeding 2</td>
<td>1/6</td>
<td>1/6</td>
</tr>
<tr>
<td>Exceeding 1</td>
<td>6d.</td>
<td>6d.</td>
</tr>
</tbody>
</table>

Bonds and Mortgages.—These duties are also charged at a uniform rate throughout, viz., 2/ per cent. for every 100/, and any portion of 100/, except that on sums not exceeding 300/ the duty is imposed by fifties, so as to charge only 1/ 3d. on the fraction over 50/, thus favouring minor transactions, instead of the more important ones as under the old system. The rates are too low to adjust and weigh up the principle; as will be perceived when it is stated that the duty on the mean sums in the scale, from not exceeding 60/ to not exceeding 20,000/ gradually diminished from 4/ per cent. to 2/ 3d. per cent. on the highest duty being 4/ on 40,000/ or over, 2/ 3d. per cent., and that this rate proportionately diminished with the increase in the amount of money secured.

The following is a comparison of old and new duties on bonds and mortgages for sums not exceeding 20,000/—

<table>
<thead>
<tr>
<th>£</th>
<th>Old Duties.</th>
<th>New Duties.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amounting to 100</td>
<td>5/</td>
<td>5/</td>
</tr>
<tr>
<td>Amounting to 50</td>
<td>2/6</td>
<td>2/6</td>
</tr>
<tr>
<td>Amounting to 25</td>
<td>1/6</td>
<td>1/6</td>
</tr>
<tr>
<td>Amounting to 20</td>
<td>1/6</td>
<td>1/6</td>
</tr>
<tr>
<td>Amounting to 10</td>
<td>6d.</td>
<td>6d.</td>
</tr>
<tr>
<td>Amounting to 5</td>
<td>1/</td>
<td>1/</td>
</tr>
<tr>
<td>Amounting to 2</td>
<td>6d.</td>
<td>6d.</td>
</tr>
<tr>
<td>Amounting to 1</td>
<td>6d.</td>
<td>6d.</td>
</tr>
</tbody>
</table>

And proceeding upwards to £20,000 by thousands, dropping the intermediate hundreds, the comparison will be as follows, viz.:—

<table>
<thead>
<tr>
<th>£</th>
<th>Old Duties.</th>
<th>New Duties.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amounting to 100</td>
<td>15/</td>
<td>15/</td>
</tr>
<tr>
<td>Amounting to 50</td>
<td>7/6</td>
<td>7/6</td>
</tr>
<tr>
<td>Amounting to 25</td>
<td>4/6</td>
<td>4/6</td>
</tr>
<tr>
<td>Amounting to 20</td>
<td>4/6</td>
<td>4/6</td>
</tr>
<tr>
<td>Amounting to 10</td>
<td>2/6</td>
<td>2/6</td>
</tr>
<tr>
<td>Amounting to 5</td>
<td>2/6</td>
<td>2/6</td>
</tr>
<tr>
<td>Amounting to 2</td>
<td>1/</td>
<td>1/</td>
</tr>
<tr>
<td>Amounting to 1</td>
<td>6d.</td>
<td>6d.</td>
</tr>
</tbody>
</table>

At this point the old duties stopped, there being no increase beyond 25/, whatever might have been the amount of money secured; but the new duties continue on, ad infinitum, at the rate of 1/ 6s. for every additional 1000/, and in proportion for less than 1000/.

A mortgage, or (as in Scotland) a bond without penalty, for securing money to become due, without limit, is available as a security for such an amount, only, as the duty thereof extends to cover. In other cases the duties of the old duty is charged on the amount of the penalty.

A mortgage for securing money by way of rent-charge or annuity is chargeable with ad valorem duty on the money advanced. The case of an advance of money under the private Drainage Act (12 & 13 Vict. c. 101) is referred to in the work of a writer on the stamp laws (supplement to Tilley's Treatise on the Stamp Laws, p. 26) as an instance in which this will apply. The rates on annuity bonds are somewhat varied. Where the annuity does not exceed 100/, relief, to some extent, is given; above that amount there is an increase,
which is greater as advance is made upwards. The new duty is 2l. for every 100l., and any fraction of 100l. per annum; the former duty was not a per centage, but, as in other cases, according to a scale, but not extending beyond 2000l. a year. The present duty is not limited.

A new duty is now only to be charged on bonds given for any other purpose than as a security for money, where the penalty is of comparatively small amount. Under the old law the duty in every such case was 1l. 15s., or some other fixed sum; it is now the same duty as would be payable on a mortgage, and where the mortgage is relatively of greater value, as the penalty, where such latter duty is less than the fixed sum. Bonds given as a collateral or additional security for money are likewise charged with ad valorem duty where it would have been charged in an ordinary mortgage. The former duty was charged as an annuity, or as the penalty, where such latter duty is less than the fixed sum. Bonds given as a collateral or additional security for money are likewise charged with ad valorem duty where it would have been charged in an ordinary mortgage.

Leases.—Under this head the equity of the new system, by comparison with the old, will perhaps be more striking than under any other. The present rate of duty on the rent is 10s. per cent.; imposed thus, viz., where the yearly rent exceeds 100l., then for every 50l., and any fraction of 50l.—6d., but upon rents of lower amount than 50l., the proportionate duty is charged in smaller steps, involving a less amount of duty for any fraction; thus, again, having favourable regard to matters of comparatively small value, and reverting the former system, the rates are still based on the mean sums in the scale, were as follows, viz. 10s. per cent. on rents under 20l.; 6d. per cent. on rents under 100l.; 1l. 6s. 8d. on rents under 100l.; and gradually decreasing to 1l. 15s. on rents of 1000l. or upwards being 10l. only. Relief for the most part to the agricultural interest no doubt prompted the adoption of so liberal a measure, but it will be found, perhaps, more extensively advantageous to the owners and occupiers of land.

A lease of minerals reserving a portion of the produce, by reference to an annual maximum or minimum amount, is to be charged with duty on such amount; and where the fine or rent consists of coal or gas, and the duty is charged on the value, to be ascertained where there is no special contract by the returns published under the Tithe Commutation Act, or, in Scotland, the fairs prices of the county.

Assignments and surrenders of leases (not upon sale or mortgage) are to pay the same ad valorem duty, if not exceeding 1l. 15s., as the lease itself would be liable to. The duties on leases in Ireland are to be the same as in England.

Settlement of Money.—All the advantage afforded by the new Act in respect of the ad valorem settlement duties is on sums not exceeding 600l. The new duty is 5s. for every 100l. unlimited, and any fraction of 100l. The lowest duty under the former law was 1l. 15s., which extended to cover any provision for payment, the interest amounting to 20,000l. or upwards; being 7s. per cent. on the mean sum under 1000l., and averaging less than 2s. 6d. on the mean sums above 1000l., and under 20,000l. Thus the order of taxation is again rightly reversed.

These are the ad valorem duties affected by the new Act; and they may be said to be the only ones connected with the transfer of property by way of sale or security. Reference will now be made to other alterations which affect almost uniform relief.

Transfer of Mortgage.—This is an important branch of conveyancing; but it appears from the work of the writer already referred to, that it is one that has been more perplexed than any other by the Stamp Duties; and the result of much discussion of a very minute kind, or rather of examining previously existing, was to inflict an amount of charge not considered to have been intended by the legislature. The shifting of a mortgage security from one to another is always a cause for vexation to the debenture; but to the poor man it is a matter of serious moment. Independently of professional charges for investigating the title, and for preparing the conveyance, the stamp duty was, of itself, an intolerable burden. The lowest ad valorem mortgage duty, oppressive as it was, amounted to 1l. 15s.; and as in every instance a new covenant was, as a matter of course, contained in it, a further duty of 1l. 15s. became, under a recent authority, chargeable; making 3l. 10s. (besides a third stamp of 1l. 15s. for the duty on the lease of the property) charged on every transfer of mortgage, whether the money secured was under 100l. or above 20,000l. This is now remedied. The maximum duty on a transfer of mortgage is 1l. 15s.; and where, if the transaction was a mortgage, instead of a transfer, the ad valorem duty would be less than 1l. 15s., then such ad valorem duty only is to be charged. Thus, for example, on a transfer of a mortgage for 100l., the stamp duty, instead of 3l. 10s. as the lowest amount, as heretofore, is now only 1l. 15s.; and on all transfers where the money secured does not exceed 1400l. further proportionate relief is given. Where, on a transfer, further money was advanced, the ad valorem duty on such further advancement is chargeable in like proportion, under the new law. Thus, if for 1l. 15s. in all cases, are now charged with that amount as a maximum, the ad valorem duty being payable where less than 1l. 15s.

Further Advance.—Besides the duty on the further money lent, 1l. 15s. was necessary if the deed contained any additional security, by covenant or otherwise, for the original sum. Now, merely the ad valorem duty on the further advance is requisite.

Bargain and Sale (or Lease) for a Year.—Whilst the cumbersome mode of conveyance of freehold property by actual lease and registered warrant has been superseded, there is no inconsistency in imposing a stamp duty upon each of them; but when, by modern enactments, that system was superseded, and one of the instruments ceased to have, in its practical effect, any existence, it may be felt that it is inconsistent, as it was felt to be exceedingly inconvenient in practice, to encumber the other deed with the duties on both; but so it was; the release, or grant which had a new conveyancing principle given to it, was charged with the duty before the Act, 1l. 15s., and 1l. 6s. 8d. on the year, as well as that which was properly its own. These duties are now swept away entirely. Under the title Co-ownership certain additional duties were imposed on a feuference or bargain and sale executed as instruments of the duty on a lease for a year; these are, of course, removed.

Progressive Duties.—A vast improvement will be effected in conveyancing when any system can be established which shall materially curtail instruments in their verbosity. Something has been attempted by the legislature in this way, but without, at present, producing in general practice any alteration. The great length to which a deed may extend is by no means an indication of the value of the subject-matter; and it is sufficiently oppressive that, to effect a transaction of perhaps 200l. in which a petit clears of charge and makes his title, an instrument of considerable length must be created, swelling the professional charges to an inordinate amount; but the burden is increased by stamp duties imposed, without regard to the amount of any one of them, and thus are imposed on papers referred to in certain instruments as part thereof but not annexed. A provision is contained in the Act (section 11) that progressive duties shall not be, or be deemed to have been, chargeable on any instrument in respect of any other instrument, liable to stamp duty, and only stamped, incorporated with or referred to in it; so that an old document, duty stamp-d per se, may be made to form a part of a new one without being taken into account in calculating the progressive duty on the latter.

Duplicates and Counterparts.—In the case of settlements of money and a few other instances where ad valorem duties are payable, duplicates were expressly charged with the same duties as the original instruments; and counterparts became also liable, in some cases, to the like duties; but, in general, they may be stated to have been subject to a duty of 1l. 15s. except as to leases, the counterparts or duplicates of which were exempt by virtue of the date on which they were charged with 3l. 10s. These duties are now reduced to 5s. as a maximum, with progressive duties of 2s. 6d. the same duty, including the progressive duty, as the original, being imposed where such duty exclusive of progressive duty is less than 5s.

Memorial.—The duty on a memorial for registering a deed is reduced from 10s. to 2s. 6d.

Copyhold.—In all cases of sale and mortgage of copyhold
property the instruments charged with ad valorem duty are, of course, liable only to the new duties; but there is one instance in which the instrument was not subject to ad valorem duty. In the case of an admissibility the instrument was charged with 11½, or, where the yearly value did not exceed 14, with 5s. By the new Act these duties are reduced from 6s. ad. to the admissibility, and the case, 11s. ad. on a mortgage. In all other cases the duty on an admissibility remains as before.

Covenant.—A particular duty is now for the first time charged on a deed of covenant. It was, it seems, apprehended that the ad valorem being a common-sense, a practice might be resorted to of executing a covenant, as a security, which would be liable only as a common deed to 11½s., in lieu of giving a bond; it was therefore thought proper to impose the same ad valorem duty on a deed of covenant as on the latter. But relief is given in the case of a separate deed of covenant, executed on the sale or mortgage of any lands, for title, &c. by imposing 10s.; or less, where the duty on the conveyance is.

Agreement.—The duty of 2s. 6d. on an ordinary agreement remains as before, except that this amount is sufficient for any number of words less than 30 folios, instead of merely a quantity not exceeding 15 folios. But in lieu of the duty on the first 15 folios in any agreement exceeding quantity, and of 1½s. for every additional quantity of 15 folios, the duty now is 2s. 6d. for every such further quantity.

The advantage of this may be illustrated by the following example: suppose a contract for the performance of any work, and specified in words amounting to 100 folios, the figures amounting altogether to 100 folios, the duty under the old law would have been 11½s., and five times 1½s. for five entire quantities of 15 folios after the first, making altogether 70s. 6d. By the new law the duty imposed is six times 2s. 6d., making only 15s.

Charter, Precept, Resignation, and Seisin.—The duties on certain instruments in Scotland under these heads, are reduced from 9s. to 5s.

Warrant of Attorney.—The duties on securities of this description are as before, the same as on bonds, with a reduction of the duty on a warrant of attorney given as a collateral security, from 11½s. to 5s., where the duty on the principal instrument exceeds that amount; and also, where it is given for money exceeding 500l. for which the person giving it is under arrest. A warrant of attorney given for any other purpose than as a security for the payment of money or the transfer of stock is charged with 11½s., which is an increase, the former duty in such case being 11½s.

The foregoing are all the cases in which the duties have been altered by the new Act; but there are some material provisions which it will be proper to glance at.

The provisions of former Acts relating to Stamp Duties are kept in force, including exemptions. Certain agreements for setting lands in Ireland which were charged with ad valorem duties as leases, but which, if in England would have been subject only to the duty of 2s. 6d. as agreements, are to be deemed to have been liable to the latter duty.

Any person receiving money for stamp duty (including legacy duty) and not applying it, is to be accountable to the Crown by summary process.

Transfers of mortgages, further charges, and further securities executed before the 11th October, 1850, are not to be deemed to be liable to the additional duties already pointed out and attaching by reason of the decisions alluded to, but, in this respect, are to be put upon the same footing as those executed subsequently.

The terms on which instruments may be stamped after execution are materially varied. The penalty, in ordinary cases payable on stamping an instrument executed before the passing of the Act is 6d. upon payment of which and the duty, the stamp may be affixed. By the new Act the penalty is 10s.; and where the duty required exceeds 10s., then, further interest at 6l. per cent. per annum on the duty, calculated from the time of not first execution of the instrument; but no amount of interest beyond that the duty is to be paid by way of penalty. In lieu of a receipt for the duty and penalty as formerly, a stamp denoting the payment of the duty is to be impressed. One advantage to the party is however given. Under the old law, if an instrument was stamped, but with an insufficient amount, the whole duty was to be paid without regard to what had been already paid besides the penalty; but now, the deficient duty only is required.

Where instruments are executed abroad, the commissioners are empowered to stamp them without penalty at any time within two months after they are received in this kingdom. Until this Act there existed no power to determine what stamp duty was payable in any case, so as to assure parties that the stamp on an instrument was sufficient. The Commissioners are now invested with a power to adjudicate in all such cases, and to certify by means of a particular stamp, that the instrument is duly stamped, and so to preclude all question upon the point. The fee for obtaining this adjudication is 10s. An appeal is given to the Court of Exchequer.

The duties in Great Britain and Ireland are now assimilated, but it appears that a deed liable to Irish duty could not be stamped in London; and vice versa: this is now permitted.

By the Act of the 12 & 13 Vict. c. 80, the discount of 7½, 10s. per cent. allowed on the purchase of receipt stamps, was taken away; by the act now under consideration it is restored.

Licences to insure against fire both in Great Britain and Ireland are necessary before any such insurance can be made; but they were all formerly required to be obtained annually, but by the Act c. 79, such licences in Great Britain were to be permanent; the same provision is by the recent Act made as to Ireland.

One or two examples have been already given of the benefit to be derived from the new scale of duties in particular transactions, which are of common value; it will be well to furnish as instance or two more.

Take the case of a sale of freehold property for 150l., the conveyance consisting of 40 folios, that is one entire quantity of 2s. 6d. By the Act of 1850, after the first, and requiring, therefore, one progressive duty. Under the old law the duties would be as follows:

<table>
<thead>
<tr>
<th>Z. S. D.</th>
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<tbody>
<tr>
<td>Ad valorem duty</td>
</tr>
<tr>
<td>Ditto in lieu of a lease for a year</td>
</tr>
<tr>
<td>Progressive duty</td>
</tr>
<tr>
<td>Total</td>
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</table>

Under the new Act the duties are:

<table>
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<tr>
<th>Z. S. D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ad valorem duty</td>
</tr>
<tr>
<td>Progressive duty</td>
</tr>
<tr>
<td>Lease for a year</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

They are now—

<table>
<thead>
<tr>
<th>Z. S. D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ad valorem duty</td>
</tr>
<tr>
<td>Progressive duty</td>
</tr>
<tr>
<td>7 6</td>
</tr>
</tbody>
</table>

The great feature of the 16 & 17 Vict. cap. 59, was the reduction of receipt stamps for all sums amounting to 40s. and upwards to an uniform rate of 1d. The stamp may be either impressed or affixed, but must be cancelled by the signature, and a penalty of 10s. is imposed for neglecting or refusing to give such a stamp with a receipt. The other provisions were—that indentures or covenants for an apprentice, clerk, &c., where no money was paid, was fixed at 26s. 6d.; deeds of conveyances for drawbacks or bounties, 1s. if not exceeding 10l., 2s. 6d. above 10l. and not exceeding 50l., 5s. if above 50l.; drafting deeds or papers for payment of money on demand, 1d. (bankers' cheques and letters of credit sent abroad were exempt by the Act; but now, May 1858, a bill is passing through Parliament, by which all bankers' cheques are to be a penny stamp); policies of assurance, 6d. on every 50l. up to 1000l., 1s. for every additional 1000l., up to 1000l., and 10s. for every additional 1000l. (the fractional parts in each case carry the additional stamp). By cap. 63 the stamp on articles of attorney's clerk was reduced from 120l. to 60l.; attorneys and conveyancers are now charged 1d. for every conveyance, and also the conveyance duties on feus-rents in Scotland.

The 17 & 18 Vict. c. 63, is for altering certain Stamp Duties, the effect of which is sufficiently shown by the new scale given in the schedule, which we subjoin. It is only necessary further to give the more material enactments set
indicated in the schedule. By § 4, bills purporting to be drawn abroad are to be so deemed, though drawn in the United Kingdom, and are chargeable with duty accordingly; and the holder of a bill drawn out of the United Kingdom (§ 6) is to affix an adhesive stamp of the proper amount before negotiating it, and the neglect to do so, or to cancel the stamp, incurs a penalty of £100. Bills purporting to be drawn in sets (§ 6) must be so drawn under a penalty of £100. Unstamped drafts on bankers (§ 7) are not to be circulated beyond fifteen miles from the place where payable, under a penalty of £50; but drafts (§ 8) lawfully issued unstamped, may be circulated at any distance by affixing and cancelling the proper stamp. Stamps (§ 10) denoting the duty of one penny may be used for receipts or drafts without regard to their special appropriation. All bills, drafts, and notes (§ 15), except Bank of England notes, are rendered liable to the stamp duty. The exemption from the stamp duty (§ 13) of letters acknowledging the receipt of bills, promissory notes, &c., is repealed; but receipts for money paid to the Crown are still exempted, the stamp duty on paywbrookers' licences in Dublin (§ 20) is reduced from £5 to 7½, 10s. Instruments liable to stamp duty (§ 27) are to be admitted in evidence in any criminal proceeding although they be not stamped.

Schedule—Inland bill drafts, exchange, draft, or order for the payment to the bearer, or to order, at any time otherwise than on demand, of any sum of money.

<table>
<thead>
<tr>
<th>Not exceeding</th>
<th>£</th>
<th>£ a. d.</th>
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</thead>
<tbody>
<tr>
<td>£10</td>
<td>20</td>
<td>0 0 0</td>
</tr>
<tr>
<td>£25</td>
<td>50</td>
<td>0 0 0</td>
</tr>
<tr>
<td>£50</td>
<td>100</td>
<td>0 0 0</td>
</tr>
<tr>
<td>£100</td>
<td>200</td>
<td>0 0 0</td>
</tr>
<tr>
<td>£200</td>
<td>400</td>
<td>0 0 0</td>
</tr>
<tr>
<td>£500</td>
<td>1,000</td>
<td>0 0 0</td>
</tr>
<tr>
<td>£1,000</td>
<td>2,000</td>
<td>0 0 0</td>
</tr>
<tr>
<td>£2,000</td>
<td>4,000</td>
<td>0 0 0</td>
</tr>
<tr>
<td>£5,000</td>
<td>10,000</td>
<td>0 0 0</td>
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</tbody>
</table>

Foreign bill of exchange drawn in, but payable out of, the United Kingdom.

If drawn singly or otherwise than in a set of three or more, the same duty as on an inland bill of the same amount and tenor.

If drawn in sets of three or more, for every bill of each set,

Where the sum payable shall not exceed £25 and not exceeding £50
Where it shall exceed £25 and not exceeding £50
Where it shall exceed £50
Where it shall exceed £100
Where it shall exceed £200
Where it shall exceed £500
Where it shall exceed £1,000
Where it shall exceed £2,000
Where it shall exceed £5,000
Where it shall exceed £10,000
Where it shall exceed £20,000
Where it shall exceed £50,000
Where it shall exceed £100,000

Promissory note for the payment, either to the bearer on demand, or in any other manner than to the bearer on demand, of any sum of money,

<table>
<thead>
<tr>
<th>Exceeding £100 and not exceeding £200</th>
<th>£</th>
<th>£ a. d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>300</td>
<td>0 0 0</td>
</tr>
<tr>
<td>400</td>
<td>600</td>
<td>0 0 0</td>
</tr>
<tr>
<td>600</td>
<td>900</td>
<td>0 0 0</td>
</tr>
<tr>
<td>1,000</td>
<td>1,500</td>
<td>0 0 0</td>
</tr>
<tr>
<td>2,000</td>
<td>3,000</td>
<td>0 0 0</td>
</tr>
<tr>
<td>3,000</td>
<td>4,000</td>
<td>0 0 0</td>
</tr>
<tr>
<td>4,000 and upwards</td>
<td>5,000</td>
<td>0 0 0</td>
</tr>
</tbody>
</table>

Lease or tack of any lands, tenements, hereditaments, or heritable substance for any term of years exceeding thirty-five, at a yearly rent, with or without a fine, premium, or grant paid for the same, the following duties in respect of such yearly rent:

If the Term shall not exceed 10 years.
If the Term shall exceed 10 years and not exceed 100 years.
Where the yearly rent shall not exceed £5.
Where it shall exceed £5 and not exceed £10.
Where it shall exceed £10 and not exceed £20.
Where it shall exceed £20 and not exceed £30.
Where it shall exceed £30 and not exceed £50.
Where it shall exceed £50 and not exceed £100.
Where it shall exceed £100 and not exceed £200.
Where it shall exceed £200 and not exceed £500.
Where it shall exceed £500 and not exceed £1,000.
Where it shall exceed £1,000 and not exceed £2,000.
Where it shall exceed £2,000 and not exceed £5,000.
Where it shall exceed £5,000 and not exceed £10,000.
Where it shall exceed £10,000 and not exceed £20,000.
Where it shall exceed £20,000 and not exceed £50,000.
Where it shall exceed £50,000 and not exceed £100,000.
Where it shall exceed £100,000 and not exceed £200,000.
Where it shall exceed £200,000.
Where it shall exceed £500,000.
Where it shall exceed £1,000,000.
Where it shall exceed £2,000,000.
Where it shall exceed £5,000,000.
Where it shall exceed £10,000,000.
Where it shall exceed £20,000,000.
Where it shall exceed £50,000,000.
Where it shall exceed £100,000,000.
Where it shall exceed £200,000,000.
Where it shall exceed £500,000,000.
Where it shall exceed £1,000,000,000.

And where any such lease or tack as aforesaid shall be granted in consideration of a fine, premium, or grant, and also of a yearly rent, such lease or tack shall be chargeable also, in respect of such fine, premium, or grant, with the ad e facade stamp duties granted under the head or title of "conveyance" in the schedule annexed to the Act passed in the 13 & 14 Vict. c. 97.

Exemption,—Any lease made in pursuance of the Trinity College, Dublin, Leasing and Perpetuity Act, 1851.

Conveyance of any kind or description whatsoever in England or Ireland, and charter, disposition, or contract containing the first original constitution of fen and ground annual rights in Scotland (not being a lease, except for the life of the person entitled to the same), in consideration of an annual sum payable in perpetuity or for any indefinite period, whether for farm or other rent, feu duty, ground annual, or otherwise. The same duties as on a lease or tack for terms exceeding 100 years, at a yearly rent equal to such annual sum.

Exemptions.—Any lease or tack for a life or lives not exceeding three, or for a term of years determinable with a life or lives not exceeding three, by whomsoever granted; and any grant in fee simple or in perpetuity, made in Ireland, in pursuance of the Renewable Leasehold Conversion Act, or in pursuance of the Trinity College (Dublin) Leasing and Perpetuity Act, 1851; all which said leases or tacks and grants respectively shall be chargeable with the stamp duties to subject to which the same were subject and liable before the passing of the Act 18 & 17 Vict. c. 63.

Every such lease or tack, and every such conveyance, charter, disposition, or contract as aforesaid hereby charged with duty, and the duties of counterpart thereof respectively, shall be chargeable with the respective stamp duties granted and made payable under the several heads or titles of "Diplotype or Counterpart," and "Progressive Duty," in the schedule annexed to the 13 & 14 Vict. c. 97.

License to demesne copyhold lands, tenements, or hereditaments, or the memorandum thereof if granted out of court, and the copy of court roll of any such licence if granted in court.

Where the clear yearly value of the estate to be demised shall be expressed in such licence and shall not exceed £70. The same duty as on a lease at a yearly rent equal to such yearly value, under the Act of the 13 & 14 Vict. c. 97.

And in leases or tacks, 10s.

STANDARD MEASURE, WEIGHT, &c. The imperial standard yard, and standard pound troy having been de-
STANLEY, REV. EDWARD, D.D., Bishop of Norwich, was born in London on the 1st of January 1779. He was the second son and seventh child of Sir John Thomas Stanley, Bart., of Alderley Park, Cheshire, by Mary, daughter and heiress of Hugh Owen, Esq. of Pencroes in Anglesea. His elder brother, who inherited the manor and estate on his father's death in 1789, was given the title of Berch of Alderley. In his boyhood the future bishop had a passion for the sea and would have preferred the navy to any other profession. Being destined for the Church however he was sent, in 1798, after a desultory education at various schools, to St. John's College, Cambridge; and here in 1802, he graduated B.A. and was 16th Wrangler of his year. He took the degree of M.A. in 1805. In that year, having meanwhile travelled on the Continent and having made a tour in France, during which he visited the Lyceum of Diderot, which was presented by his father to the family living of Alderley. In 1810 he married Catherine, eldest daughter of the Rev. Oswald Leycester, rector of Stoke-nan-Trent, Shropshire. He was rector of Alderley for six years (1805-37) during which he discharged his duties in a manner so conscientious and so thorough as to gain the affection of all his parishioners in an unusual degree. He worked assiduously among the population of his parish—white and black, pure and mixed. He was a man of purely clerical duties, he did everything in his power, by encouraging schools and the like, to promote the intellectual and secular welfare of his parishioners. For the use of the young in his parish he prepared 'A Series of Questions in the Bible' which was published in 1815. Inheriting Whig principles from his family, he was noted at this time for great liberality and toleration in his ecclesiastical opinions; though the zeal and the warm-heartedness of his Christianity were unfeigned. It was perhaps his slight interest in matters of purely theological controversy that inclined him at this time to the quiet pursuit of natural history. Using the opportunities afforded him by his position as the clergyman of a rural parish, he gratified his tastes in this direction by becoming acquainted with the geology, the mineralogy, the botany, the entomology, and the ornithology of his parish. He became a contributor on topics of natural history, and on kindred topics, to 'Blackwood's Magazine' and 'Clerical Magazine'; and 'Blackwood,' entitled 'Adventures on the Alps in the Mauvais Pas' is supposed to have suggested to Scott the opening scene in his 'Anne of Geierstein.' The department of natural history which he principally cultivated was the geology. He was a member, and, for a time the author of the Society for Promoting Christian Knowledge, his well-known work in two volumes entitled 'A Familiar History of Birds, their Nature, Habits, and Instincts. He had already lectured on subjects of natural history to one or two Mechanics Institutions in the north of England, and in 1836 he was Vice-President of the British Association. He was also a Fellow of the Royal Society and President of the Literary Society. Though obstreperous in obtruding his politics on his parishioners, he had taken part on the liberal side on some of the questions of the day relating to the Church. In 1829 he had published 'A Few Words in favour of our Roman Catholic Brethren,' advocating Roman Catholic Emancipations; and in 1835 he published 'A Few Notes on Religion and Education in Ireland.' The spirit abounding in these pamphlets, taken along with his excellent character, and his family-connections, secured him to the Whig government as a suitable man for a bishopric. The long vacancy of the see of Norwich by the death of Bishop Bathurst in 1837, Lord Melbourne offered the bishopric to Dr. Stanley. It was with much reluctance that he quitted the parish where he had lived for so long, and accepted the prebend; with which was cojoined the appointment of Clerk of the Closet of the Chapel Royal. Having accepted the office, however, he set himself with great zeal and punctuality to its duties. Seldom has there been a more hardworking bishop, or one more sanguine in all schemes of improvement. He abandoned his pursuit of natural history and devoted himself exclusively to diocesan business. As the previous bishop had lived to the age of ninety-three, there were necessarily great abuses in the diocese—abuses of which he drew attention to, and, in the manner which he himself to reform with a boldness, which, though successful in the end, aroused much bad feeling against him. As in the House of Lords and elsewhere, where public questions were discussed, he always took what was called The Liberal side of an argument.
Essays," not published till 1810, which he expanded in 1811-19 into three volumes of a 'Handbuch der Ornithologie.' On returning to Denmark in 1802, he excited considerable attention by his lectures; but as he experienced some coldness from influential persons, he accepted in 1804 a call from the University of Jutland, where he remained until 1811. A great part of his works were published (in 1806) his "Grundriss der philosophischen Naturwissenschaft" ('Fundamental Features of Philosophical Natural Science'). The years 1807-9 he spent with his friends in Holstein. He then returned to Halle, and took an extensive part in the preparation of the secret preparations of the Prussian patriots to cast off the French yoke, which they felt to be alike burdensome and disgraceful. When the time for action arrived, Steffen was just beginning to study entomology. The patriotic Addresses roused and supported the energy of his comrades, with whom he continued till the entry into Paris in 1813. After this he returned to Breslau, where he had been created professor of physics and of natural history. These offices he held till 1815, when he removed in a similar capacity to the University of Berlin, in which city he died on February 13, 1845. While in Breslau he wrote, in connection with what may be called his professional pursuits, he published his "Leipziger Verhandlungen für die naturwissenschaftlichen und allgemeinen deutsche gelehrten Anzeigen", an elaborate treatise on entomology, his "Philosophische Studien der Philosophie der Geschichtsphilosophie", a sequel to his 1836; but these works rather represent the philosophy of the Schelling school than add to our knowledge by any new facts. The intellectual activity and mental riches of Steffen however were not confined to one branch of knowledge, and he was often engaged in the thoughts and feelings of his fellow-countrymen. To this description of works belong his essay 'Ueber die Idee der Universitäten' ('On the Ideas of the Universities'), 1807; 'Die gegenwärtige Staatsaufgaben', 1810; 'The present Time, and how it became', 1817; and 'Ueber geheime Verbindungen auf Universitäten' ('On the secret Societies of the Universities'), 1835. His disinclination also to the attempted church union in Prussia rendered him at first the leader of a considerable number of dissenters from that union, and at length involved him in many controversies, which ultimately occasioned the production of his work 'Von der falschen Theologie und dem wahren Glauben' ('On the False Theology and the True Faith'), in 1834, of which more than one edition has been called for. In 1831 he published 'Wie ich wieder Lutherer wurde und war mir das Lutherthum ist' ('How I became again a Lutheran, and what Lutheranism is to me'), which is a personal confession of his conscientious belief in the Christianity of the fathers. In 1837 he also stepped into a new line: he began a series of novels, of which the first 'Die Familien Walseth und Leith,' in three volumes, was followed in 1836 by 'Die vier Norweger,' in six volumes, and that by 'Malcolm' in two. These novels contain many references to himself both in the incidents and opinions, but they also contain well-defined pictures of the peculiarities of national character, narratives of the historical events of the period, with lively and correct descriptions of scenery, experiences in the life of a countryman, with the feelings, even with the passions, and all are penetrated with a deep-lying religious feeling, which give them a peculiar character. In the last years of his life he occupied himself with writing a detailed autobiography, 'Was ich erlebt,' published in ten volumes, from 1840 to 1845. It is perhaps too minute, but contains many interesting facts, and a fragment of it has been translated into English under the title of 'Adventures on the Road to Paris,' an account of the advance of the allied armies in 1814. Several of his writings have been published, 'Nachgelassene Schriften,' with a preface by Schelling.

**STELLITTE.** [Age: 70; born Breslau, Prussia, 1779; died 1859.]

**FRANCIS,** a distinguished British entomologist, was born at Shoreham, Sussex, on the 16th of September 1792. He was for many years a clerk in the Admiralty Office in Somerset House. Whilst holding this position he devoted his leisure hours to the study of natural history, and was a remarkable example of the knowledge that may be gained by the cultivation of the small portion of time allotted for rest in a government office. In the course of a long life he made one of the most complete collections of British insects extant. This collection was the admiration of many entomologists, and was presented to the British Museum by his great friend, Mr. Stephens's taste for entomology led early to the establishment of a collection in the British Museum, where he assisted Dr. Leach in commencing the present collection of insects in that institution. The literature of entomology is largely indebted for its present state to the laborious industry of his illustrations of British Entomology,' which was produced in parts and published from the end of 1792. In addition to this splendid work, he published several papers on entomological subjects, which appeared in the 'Transactions of the Entomological Society.' He was also engaged at the time of his death in writing a catalogue of the British Lepidoptera in the collections of the British Museum. He also published separately 'The Systematic Catalogue of British Insects,' and 'A Manual of the British Coleoptera.' Although distinguished for an extensive, yet his interest in all branches of natural history, and was the author of the 'Wonders of Shaw's Zoology' comprising an account of the Birds, published in 1837. He was a fellow of the Linnean Society, and president of the Entomological Society. He died on the third of October, at his residence at King's Lynn, after a few days' illness, of inflammation of the lungs.

**STEPHENSON, GEORGE,** the inventor of the locomotive steam-engine, was the son of Robert Stephenson and Rachel Carr, and was born June 9th, 1781, at Wylam, a village in Northumberland, where he was a fireman at a colliery; he afterwards removed to Dewley Burn in the same county, where George's first employment was to herd cows, occupying his leisure in modelling clay models of machines and vessels. He was soon called to be employed about the colliery, during which time he displayed a great affection for birds and animals, particularly rabbits, of which he acquired the reputation of having a fine breed. At fourteen years of age he was appointed assistant-firman to his father, who soon after removed to another colliery at Jolly's Close, where George, then only fifteen, was engaged as firman to an engine in the neighbourhood. Ambitions of becoming an efficient workman, he strove to attain a thorough knowledge of the engine, and he succeeded so well that at seventeen he was promoted to be a 'plumgar,' whose duty it was to see that the engine was in proper working condition, and that the pumps drew water effectually; repairing such accidental defects as might arise in the engine. The workman was employed in the construction, and at his leisure hours he would take the machinery to pieces, that he might the better understand it. His father, who had six children, of whom George was the oldest, had been unable to give them any education. In youth by example a sound foundation of good principles and morals had been laid, and at eighteen, whilst employed for twelve hours a day in his labours, and earning only twelve shillings a week, George Stephenson commenced a course of self-education. He attended a small night-school at Walton, where in a year he learnt to read, and to write his own name, for which instruction he paid threepence a week. He next, in 1799, placed himself under a Scotchman named Robertson, at Newburn, who for fourpence a week taught him arithmetic, which he soon learnt, and also taught him a facility for writing. Twenty years he had been advanced to the superior office of brakesman, with increased wages, to which he added, in his leisure hours, by learning to make and mend shoes. At that time he was a big, raw-boned fellow, with strong hands, and strength and activity at the village feasts, but remarkable for his temperance, sobriety, industry, and good-temper, yet on one occasion he fought a bully who would have oppressed him, and his victory on that occasion secured him ever after from repetition.

When by the most rigid economy Stephenson had saved sufficient money to furnish a small house, he determined to settle, and on the 26th of November 1806 he married Fanny Anderson, the daughter of Mr. John Anderson, of Leith, Edinburgh. Robert Stephenson had been appointed brakesman to the engine employed for lifting the ballast brought by the return collier ships to Newcasle. In his new abode at the Bullet Hills, he continued to occupy himself with mechanical experiments, expending
but it was found to be unmanageable. Sir Humphry Davy was invited to attempt something; for which purpose he visited Newcastle in August 1816, and on November 9 of that year he read a paper on the construction of his third lamp before the Royal Society of London. Mr. Stephenson was at the same time occupied on the same subject. In August he made a drawing for a lamp, which on October 21, 1815, had been made and tested; a second and a third lamp were also invented to contain the amount of light; and on November 30, of that year, before he could by any possibility have heard of Davy's invention, his third lamp was finished and tried in Killingworth pit, where it was found to be more efficient than that of his competitor. No controversy has arisen, into which we shall not enter, as to priority of invention. There is, however, every reason to believe that Stephenson invented his lamp long before and had tried it a few days previous to Davy having announced his discovery; and the natural conclusion is, that he was effectually by the want of a safety-lamp, and reasoning from the same facts, the inventors arrived at the results independently of each other; for the two lamps, although different in construction, were based on identical principles, but arrived at by different trains of thought.

We cannot attempt to trace all the improvements in details which Mr. Stephenson introduced in the locomotive, but be very early perceived that, for its proper working, the engines must be provided with a sufficient steam for raising the regular level were essential requisites. Very little attention had hitherto been paid to this, and the tramroads were carelessly laid out and not kept in good repair. In 1816 therefore he took out a patent for an improved form of rail and tramroad, with engines to be placed at intervals, on one of which was placing it on springs, and they were attended with marked success.

The construction of railroads had for some time occupied much the public attention. In 1819 the engineer of the Colliery, dreading the turn their tramroad into a railway, employed Mr. Stephenson in its construction. The length was about eight miles, and being over a hilly country, he took advantage of the heights to form self-acting inclines, the length and number of which were more than doubled. In November 1822 it was opened for traffic. He was next employed to construct the Stockton and Darlington line, for which an act of parliament was obtained by Mr. Pease in 1825, to be worked "with men and horses, or otherwise." The proprietors had agreed, on his recommendation, to make the line as a railroad and not as a tramroad, with stationary engines for the steep gradients, but horse-power was to be used for the levels, for Mr. Stephenson's confident anticipations of the success of the line had been so much increased by the events of 1822.

He began the work in May 1822, but in 1823 an amended Act being procured for working the line with locomotives, Mr. Stephenson was appointed resident engineer at a salary of 300l. per annum, and upon that appointment a complaint was made that he had contrived the tramroad, which was not true. He remained on the line, however, until September, 1825, and an engine driven by Mr. Stephenson himself drew a load of ninety tons at the rate of upwards of eight miles an hour. It proved highly remunerative, for besides a far larger amount of goods traffic than had been calculated on, a passenger traffic arose that had been wholly unthought of; the passengers however were for a time conveyed in carriages drawn by a horse at a speed of ten miles an hour. It may be mentioned, that this railway has created the town and port of Stockton-on-Tees, then the site of a farm, but now containing 15,000 inhabitants.

In 1824, while the Darlington line was in progress, Mr. Stephenson, feeling the difficulty he had experienced in constructing his engines in a blacksmith's shop, proposed to Mr. Pease of Darlington, his firm friend and great patron, the establishment of an engine-factory at Newcastle. The proposal was adopted, and for a considerable time it was the only manufactory for locomotives in the kingdom. It is now incorporated with the Darlington engine-works, and he has been the training-school, whence he issued a vast number of skilled workmen and eminent practical engineers.

In 1824 the project of a railway or tramroad between Liverpool and Manchester began to be agitated. Increasedparalleled are enormous, but there was much controversy as to the means. At length a railway was decided on, Mr. Stephenson was employed to conduct the survey, and application was made to Parliament for an Act. A strong opposition was raised both within the House of Commons and without. Landowners drove
engineers off their grounds, and before the Committee the most absurd objections were urged against the whole scheme, the idea of any quick transit being a subject for especial ridicule. The Bill was however carried on a second application, and Mr. Stephenson was appointed principal engineer. The work was commenced in June 1829, and after struggling through many difficulties—one, and not the least, being the carrying the railway over Chal Moss—it was opened on Sept. 15, 1830. During its progress eminent engineers had rendered invaluable services by their advice and counsel, recommending horse traction; but at length Mr. Stephenson prevailed on the Directors to offer a prize for a locomotive engine, conforming to certain conditions, which was done, and in consequence of a prize was won by the Rocket engine, in the construction of which he had availed himself of the assistance of his son Robert.

From this moment his fortune was made. Employment of a most remunerative character poured in from all sides. Railways were projected in every direction, and he became the chief engineer of several of them. With these he was incessantly engaged till 1840, when he resigned most of them, and settled at Tapot in Durhamshire, where he commenced a fresh pursuit in working the Clay Cross collieries. At this time, however, the application of the scientific principles of mechanics to the improvement of railways had much increased, and many improvements in every part of the system, however, during however continued unabated, and he took an active part, either as engineer, chairman, or shareholder, in the Whitehaven and Maryport, the Yarmouth and Norwich, and the Newcastle and Edinburgh East Coast Line, with won of his partners and associates, as also at his own expense, Newcastle (designed by his son), was connected; he was one of the committee of management, but he did not live to see it completed. He was also employed in Belgium, and he travelled into Spain to inspect a proposed line from the Pyrenees to Madrid, but his work was from then on. On his return from Spain in 1845 he relinquished still more his attention to railway matters, and occupied himself almost entirely with his collieries and lime-works, with the cultivation of his farm and gardens, and indulged in his old favorite for keeping birds and animals. With the exception of promoting the Ambergate and Manchester Railway, inventing a new self-acting brake, of attending the ceremony of opening the Trent Valley Railway (when Sir Robert Peel made a speech complimentary to him), and of being considerably troubled by applications for assistance and advice from projects and inventors of all kinds, to whom however he was invariably attentive and kind, he passed the remainder of his days in the quiet and retirement that he desired, and great interest in the Institution of Mechanical Engineers of Birmingham, which he had founded, and was President of. He died after an short illness on August 12, 1848, leaving a name rendered illustrious by the patient perseverance of a high and noble spirit, taken certain shape and form in the hands of a remarkable genius. A valuable biography of this eminent man has been written by Mr. S. Smiles, to which we are indebted for many of the facts in this notice.

STEREOSCOPE, from survey (solid) and survey (view), an instrument by which two pictures of any object, taken from different points of view, are seen as a single picture of that object, having the natural appearance of relief or solidity.

A single picture may be seen with two eyes, yet that only a single representation of the object is presented to the mind, most of course have very early forced itself on the consideration of men of attentive and reflective habits. And it could not fail to be observed that the appearance which an object—a statue or a vase for instance—presents when looked at steadily, and with only one eye, is different from that which it presents if it be then looked at, without changing the position or moving the head, by the other eye alone. Accordingly we find in some of the earlier as well as the later Greek writers, and in some of the Roman, a distinction made between the object, and the subject, and speculations as to the cause. Euclid showed, of course, that a sphere in which each eye sees the same representation of an object; and Olen some centuries later explains his idea in the same way; but similar pictures are not seen at the same instant but successively, and that these rapidly succeeding pictures produce on the mind the impression which is concurred of the object. At the end of the 18th century, Leonardo da Vinci, and in the 19th and following centuries, Baptista Porta and Aglinonius, wrote on the subject of vision as produced by dissimilar pictures seen by each eye; but down to our own time natural philosophers have been almost universally content to adopt the opinion that the only eyes work at one time. The whole question of vision by a single eye, and of monocular and binocular vision, was reopened by Mr. Wheatstone—to whom the world is indebted for the application of electricity to telegraphic purposes—in a paper entitled 'Conjunction of the Views of Objects, and of the Part of the Field of Vision by One Eye' (1838).

Some Remarks and hitherto Unobserved Phenomena of Binocular Vision,' read before the Royal Society, June 21st, 1838, and again, before the British Association at Newcastle, in the following August, and printed in the Philosophical Transactions of the Royal Society, months later.

In this paper Mr. Wheatstone argued that the appearance of relief and solidity which we obtain in looking at objects in nature, arises from these being a dissimilar picture of the object, projected simultaneously on the retinae of each eye; and, it is the optic axes of which are not parallel; whereas in viewing a pictorial representation two similar pictures are projected on the retinae, and hence the resultant flatness. It is not necessary to enter further upon his views, nor upon the whole, for as speaking of it. He only showed that a picture treated with fully of the head sounds, vol. xxi., p. 404-6. Mr. Wheatstone sought to elucidate and confirm his theory by an ingenious instrument which he exhibited when he read his paper, called the Stereoscope. This instrument, now known as the Refracting Stereoscope, consists of two plane mirrors, fixed with their backs to each other at an angle of 90 degrees. These mirrors (or polished glass prisms) are supported on a central stand, which is fixed in place, and a mahogany framework, which has two windows to support the two pictures (which have been taken from dissimilar points of view) in the same horizontal line, parallel to each other and at equal distances, one on each side of the mirrors, The observer, by placing his eyes as close as he could to the windows, the angle of the mid-line of his face and forehead, sees the two dissimilar pictures united, so as to give the appearance of the object represented, not as it is seen depicted on a plane surface, but with all the solidity, which object in itself, the reflecting stereoscope excited great interest among scientific men when first exhibited, but the pictures prepared for it were almost exclusively dissimilar outlines of various geometrical solids—photography not being then in existence—and by those who did not employ it for a purely scientific purpose it soon came to be regarded as merely an ingenious and somewhat ornamental as well as expensive optical toy. For most purposes it has been superseded by the more convenient Refracting Stereoscope.

For the Refracting Stereoscope we are indebted to the inventor of another very beautiful contrivance, the Kaldioskope (KLEIDOSKOPE), S. L. 1832. Sir David Brewster having in 1832 prosecuted an elaborate series of experiments with a view to the establishment of what he regarded as the more correct theory of binocular vision, and some of these experiments led him to construct the instrument which, in the form it actually assemblled, he called the Lenticular Stereoscope. He early exhibited his instrument in his classes at Aulends's but he first fully explained his views on binocular vision, and made public his invention, in a paper 'On the Law of Visible Position in固体 of the Representation of Solid Figures by the notion of Dissimilar Plane Figures on the Retina,' which he communicated to the Royal Society of Edinburgh in January 1843. He further explained and defended his views in many subsequent papers, which, like the former, appeared in the Edinburgh Philosophical Transactions, of that and following years. Of these very valuable contributions to the science of optics it is unnecessary to speak further here, and into the controversy which arose between the author and Mr. Wheatstone on these views, and the theories of binocular vision, the former, as the inventors of the stereoscope, we shall not enter: the opinions of Sir David Brewster, in their manifold and digested form, will be found amply set forth in his work 'The Stereoscope,' 1844, London: Longman, Hurst, and Co., in the paper already referred to, and in another which formed the Bakerian Lecture of the Royal Society for 1839, being 'Part II. of Contributions to the Physiology of Vision, and on Binocular Vision.'
The Lenticular Stereoscope of Sir David Brewster, as described by himself, "consists of a pyramidal box of wood or metal, or any other opaque material, blackened on the inside, and having a lid for the admission of light when the pictures are opaque. The box is opened, in order to look through the right eye, and closed for looking at the pictures when they are transparent. Another lid is sometimes added, so as to open externally on the bottom of the box, for the purpose of exhibiting dissolving views in the stereoscope. The bottom of the box is generally furnished with a ground-roughness, so as to be very fine, or very fine-grained paper may be used. The top of the box consists of two portions, in one of which is the right eye-tube containing a semi-lens, or quarter-lens, and in the other the left eye-tube, also containing a semi-lens or quarter-lens. These portions may be advantageously made to approach or recede, in order to suit eyes at different distances from one another; and the tubes containing the lenses should draw out, in order to suit long and short-sighted eyes." The two dissimilar pictures (which for convenience are mounted on a thick card, forming the universally known "slide") are placed in a groove in the bottom of the box, when, on looking through the eye-tubes, they are seen united into a single picture, and the object or objects, if a proper amount of light is obtained, stand out with an almost magical appearance of relief and solidity. The employment of photography for the stereographs has wonderfully extended the range of the instrument, and now, with the eye-tubes within the hands of the manufacturer, an artist philosopher as an extremely ingenious piece of scientific apparatus, or have found a somewhat larger though less important circle of admirers as an elegant toy, has become one of the most widely known and universally popular means of amusement, and the rank and the rapidity of its development, as a serious means of instruction, is by means of these semi-lenses that the stereoscopic effect is produced, though they do not themselves produce that effect. What they accomplish is the transference of the two dissimilar pictures or stereographs to a middle point. The union of these two pictures, or their superposition on that middle point, produces the stereoscopic effect. The semi-lenses are the two halves of a convex lens, so placed that the edge or thin part of each is turned inwards— the opposite direction that is, to that which it held in its original position. How this acts may be understood by a very simple experiment. If any small object as a coin or medal be laid on a piece of white paper and looked at with the right eye only, through a convex lens, the right half of which is covered by an opaque substance, the coin will be seen some distance on the left of it, behind the glass, but still distinctly visible, for the eye be held close to the lens, and the proper focal distance be chosen. On turning the lens so that the left half is covered, and looking through the uncoated half with the left eye only, the coin will be seen at a distance on the right side of its true position. Just so the half right of a picture or plate of the stereoscope—which are placed 1½ inches apart, corresponding to the distance between the eyes— make the two pictures in the instrument to approach and become superimposed on each other. But as the pictures are slightly dissimilar, having been taken from points of view correspondent to those of the right and the left eye respectively—and as, consequently, that portion of the right side of all solid objects which the right eye sees is represented in one picture, and that portion of the left side which the left eye sees is represented in another, as well as the front which is common to both eyes, it follows that when these pictures are superimposed, the resultant single picture includes all that each eye sees, and therefore has all the apparent roundness, solidity, and relief which the original presented when looked at with both eyes; an effect aided it must be confessed by the isolation of the pictures in the chamber of the stereoscope. Various modifications have been made in the instrument—as the employment of larger lenses, the changing the size of the images formed, the reduction of the forms, &c.; but the principle is the same in all, and some of the changes are certainly not improvements.

From what has been said, an attentive reader will have no difficulty in understanding that the stereoscopic picture must depend mainly on the character of the dissimilar pictures or stereographs. This is most certainly the case, though too often overlooked or insufficiently regarded by those who take stereoscopic pictures. Stereoscopic portraits are usually taken with cameras contrived for the purpose. In order to take stereographs of landscapes, buildings, statues, &c., the ordinary landscape camera is employed; the camera being removed, after the first picture is taken, to a position parallel to that just occupied, and more or less distant from the first position in proportion to the distance from the object to be represented. The stereoscopic angle, as it is called, has been laid down by high authority at 1 in 25 for objects 60 feet or more distant, some have been taken as close as 100 feet, and they are much less distant from the first position in order to take views of an object only 20 feet distance. But the effect of such an arrangement is obviously to make one picture represent much more of the right side, the other more of the left side of the object. It would be seen by a person standing, say midway, between the two positions. And the two pictures so taken must, when united in the stereoscope, present an exaggerated and therefore untrue representation. In fact there will be, what is so commonly seen in the stereoscope, an unnatural appearance of separation between the chief object and the accessories. You see round the figure in fact, just as in life you see round a statuette or small model, and hence there arises that detached model-like appearance which is so often, and very improperly, objected to stereoscopic representations. What the stereoscope ought to show is, the representation of an object or objects in nearly the same relative solidity, relief, and separation as in life. The fragments of the historical and civil history must be ready to be exhibited if the stereographs were taken, as they ought to be, and as the most successful (though not the most popular) are taken, from positions little if at all exceeding that of the eyes apart. The great importance of strict accuracy in view of the vast range of subjects and objects that may be produced by this means of antiquities, objects of special scientific interest, &c., will be at once acknowledged; and the value of the stereoscope for affording such representations in their greatest attainable perfection is daily becoming more apparent. It will be enough to allude, as illustrating this, to the recently published views in Egypt, in which the antiques and the scenery of that country are almost literally brought home to those who cannot go to them; and to the very remarkable series of stereographs of the Peak of Teneriffe, published by Mr. Piani Smyth, in his recent work, 'Teneriffe, an Astronomer's Experiment,' which gives us almost the very cone itself, in some of its most striking and characteristic phases, to gaze upon and to study.

STERLING, JOHN, was born at Kaimes Castle, in the island of Bute, Scotland, on the 20th of July 1806. Both his parents were Irish by birth, though of Scottish descent; and his father, Edward Sterling (afterwards well known as a collector and dealer in paintings), was a schoolmaster, and, in pursuing the occupation of a gentleman-farmer, after having been educated for the Irish bar, and having served for some time as a captain in the army) had rented Kaimes Castle a short time before his son's birth. John was the second son of the family. He was a bright child, but a very boy, leaving only himself and an elder brother. In 1809, the family removed to Llanheathin, in Glamorganshire, Wales; and here John Sterling received his first school-education. His father about this time began to contribute to the 'Times' as an occasional correspondent; and the interest he thus took in politics, led him, on the peace of 1814, to remove again with his family to Paris. Driven from Paris by the return of Napoleon in 1815, he then went to Switzerland, and from thence to England, where he settled in London, where gradually the father rose to his eminent position in the world of politics and journalism. He was destined to outlive his son.

After having been at various schools in or near London, Sterling was sent to the University of Glasgow; whence, after a brief stay, he was removed in 1824 to Trinity College, Cambridge. Here Julius Hare, afterwards Archdeacon of Lewes, was his tutor, and here he formed the acquaintance of William Wordsworth, John Stuart Mill, and others. In 1827 he left Cambridge altogether.
without taking his degree. In 1828 the "Athenaeum," then recently started by Mr. Silk Buckingham, was purchased by Sterling, or at his instance, and he and Maurice conducted it and wrote in it for some time. The speculation however in their hands did not answer commercially, and the journal was sold to its present proprietor. Sterling, to whom it was not easy to part with, declared that he would not be engaged in any employment for his living, continued to reside in London, the centre of a circle of ardent and thoughtful young men, including not only his college friends, but such additions as John Stuart Mill, who was eager to learn and to be Coleridge's characteristic. It was about the year 1829 that he first became acquainted with Coleridge, then living his recuse life at Highgate; and Coleridge's influence on Sterling was great and enduring. It was evident in a three volume novel, entitled "Time and Chance," which he published in 1834, but which was not published till a year or two later. In November 1830 he married; and shortly after, being in ill-health, he and his wife went to the West Ijssel-Staad of St. Vincent, where a valuable sugar estate had been bequeathed to him, his elder brother, and a cousin, by one of his mother's uncles. He stayed about fifteen months in St. Vincent, returning to England in August 1832. In the spring of 1833 his novel was published, but obtained little recognition except from Sterling. The latter, then his tutor, the Rev. Julius Hare, at Bourn, the effect of their conversation on Sterling's mind, then vibrating under the prior influence of Coleridge, was that he resolved to take holy orders in the English Church. He became curate of Chichester on Trinity Sunday, 1834, and immediately became curate of Hurstmonceaux in Sussex, where his friend was rector.

Sterling abandoned his curacy on eight months, residing it in 1835, on account of his ill-health. It is improbable that at the same time there was a change, or a tendency to change, in his opinions. From this time, at all events, there was a gradual divergence in his views from the fixed creed of the Church of England, though his relations to men and objects did not change principle, as is evident from the great oratio he delivered in the University of Cambridge, in which he spoke of the "bestowal of the scriptures" as the "desired of all nations," and of the "fulfillment of the dispensation of the old covenant." He was thus an Evangelical, as he was to be always, but one who looked to a different and more distant future than his contemporaries. He had been with his brother, Mr. Thomas Carlyle, in Paris, where he had projected the mode of improving the illumination of lighthouses by the substitution of oil lamps with parabolic mirrors for the open coal-fires. When that gentleman was appointed engineer to the Northern Lighthouse Commissioners, he made it his first tour of inspection, and afterwards introduced a still greater improvement in the illumination of lighthouses by means of the cast-iron lamps. This new system he deemed to distinguish one lighthouse from another. In 1807, an Act having been obtained in the previous year, he commenced the construction of the Bell Rock Lighthouse, on a rock in the North Sea, a few miles off Arbroath in Forfarshire, on which the light was exhibited for the first time on Feb. 1, 1811. The rock being extremely small, and almost entirely covered, even at low-water, except in spring-tides, offered great obstacles to the construction, but they were successfully overcome, and the work, which was turned over to the National Lighthouse Commissioners, was completed. It was constructed with plates, was published at Edinburgh in 1834. A controversy has arisen as to the originality of Mr. Stevenson's plan, into which we cannot enter, but it is certain that the general principle of the "scopic" or invisible lighthouse is an old one, and was first exhibited in its perfection about 1785, and was only recently applied to secure a firm and enduring foundation, and this was undoubtedly done by Mr. Stevenson. In 1814, on another tour of inspection, Sir Walter Scott was a companion of the engineer and commissioners in the voyage, which afforded many materials for descriptions in Scott's poem of "The Lord of the Isles," and in the novel of 'The Pirate.' Mr. Stevenson held the situation of engineer till 1842, during which time he erected no fewer than 23 lighthouses. He was also employed in numerous engineering works in various parts of the United Kingdom, but chiefly in Scotland, in connection with the improvement of rivers and harbours, and the erection of piers and bridges, into which latter class of works he introduced some new principles of construction, which were likewise executed on the north of England and Glasgow, which, though not adopted, was admitted to be extremely clever. He was employed to report on other lines of railway, and he suggested the use of malleable iron rails instead of the cast-iron rails and tramplates previously in use. In 1836 he became a member of the Institution of Civil Engineers, and while he lived was looked upon as an authority of great weight on all questions connected with the improvements of ports, harbours, and rivers. He died on the 27th of July 1849, and was succeeded by Mr. F. R. M. Lock, who was the last engineer of the Northern Lighthouses, and who was appointed on the death of Mr. Stevenson.
STOCKS, [MATTHIA].

STOCKS, JOHN E., M.D., was born in 1832. He was educated for the medical profession at University College, London. Here he distinguished himself in his classes, and especially for the accuracy and Completeness of the answers which he gave to the questions which were put in the examination rooms. He obtained an appointment in the East India Company's service, and soon distinguished himself for his acquaintance with plants. He was sent to Sind and Beluchistan to report on the vegetable productions of the country, and in a succinct and comprehensive manner. He came back to England about the year 1854, intending to work up his numerous materials for publication. His health however failed him, and after having deposited his collections at Kew, he retired to Burton-on-Trent, near Burton, in September 1854.

STOCKTON. [CALIFORNIA, 2.]

STODDART, SIR JOHN, knight, was born in 1773 in the parish of St. James's, Westminster, but his father, who was a lieutenant in the navy, residing in Wiltshire, he received his early education in the grammar-school at Salisbury under Dr. Skinner. His proficiency in Greek at this school occasioned his being sent to the University of Oxford, where he was entered at Christchurch College in 1790, and graduated as B.A. in 1794. He at first studied divinity, but feeling an inclination for the law he proceeded B.C.L. in 1796, and D.C.L. in 1801. In the meantime he had neglected general literature, and in 1796 and 1798 he had published translations of Schiller's two dramas of 'Fiesco' and 'Don Carlos,' both with Dr. Noël, of which their initials appeared on the title-page. At this period he took a favourable view of the French revolution, and in 1797 published a translation from the French, entitled, 'The History of the Two Ermas.' It was directed against the principles of the Executive Directory of France, with the Lives of the present Members.' In 1801 he was admitted a member of the College of Advocates, and published Remarks on Local Scenery and Manners in Scotland, during the years 1795 and 1800, in 2 vols. 4to. In 1806, on the recommendation of Sir William Scott, he was appointed king's advocate and admiralty advocate in Malta, in which situation he remained nearly four years, when he returned to England, and resumed his practice in the courts of Doctors' Commons. In 1810 he commenced writing on political subjects in the Times newspaper, his contributions being marked J. B., and this led to his becoming the political editor in 1812. His writings in this paper were distinguished by great energy, the possession of much varied knowledge, a clear style, with a power of fulmination, too often founded on mere prejudice, that occasioned his receiving the sobriquet of Dr. Slop, and as such was buried at George Cruikshank in the parody and satire which was written by Rone. Dr. Stoddart's works were taken by some moderns as he failed in reaching to any greater similarity than that arising from their dislike to the course taken by the French revolution, which, in the doctor's case, displayed itself in the whole course of his public life, that is, as a director of the political policy. He held this important post till the close of 1816, when, as a consequence, it is said, of the disapproval of the proprietors of the continued violence of his attacks on the now imprisoned emperor, his connection with the Times was dissolved, and in 1817 he started an opposition paper called 'The New Times.' It was unsuccessful, and in a short time he left it, retired to private life, and to his practice as an advocate. In 1836 he was appointed chief-justice and judge of the Court of Malta, being knighted at the same time, and in that office he distinguished himself by his able and conscientious manner in which he discharged his duties, until his return to England in 1838. From that time till his death he led a private life, in which he was much and widely esteemed; but occasionally published pamphlets on legal subjects, and took considerable interest in the reform of the law, being one of the earliest members of the Law Amendment Society. He also wrote 'An Introduction to General History,' and a Universal Grammar; or Science of Language, which were prefaced with Memoirs of the Cypriot and Other Metropolitans, but have likewise appeared as separate works. A Statistical, Administrative, and Commercial Chart of the United Kingdom, compiled from parliamentary and other authorities, was another of his productions. He died at Brompton-square, London, on February 16, 1856; and on the first meeting of the Law Amendment Society after his death, Lord Brougham pronounced a warm eulogium on his memory.

STOKE POGES, [BUCKINGHAMSHIRE,]
bonhood of Smyrna.' On the Geology of the Island of Zante—Currents of Sea water running into the Cephalonia—A Personal Sketch of the Geology of the Western Part of Asia Minor,

On the failure of the health of Dr. Buckland, Mr. Strickland was appointed reader in geology in the University of Oxford. His powers of observation on birds are not very numerous. Amongst these the following were published in the 'Proceedings of the Zoological Society':

1. Descriptions of New Species of Birds from West Africa.
2. Notes on a certain Species of Birds from Malacca.
3. Many other papers on birds and their habits.

As a zoologist Mr. Strickland was best known as an ornithologist. He was thoroughly acquainted with the birds inhabiting Great Britain, and gradually extended his knowledge of the forms of these animals. His papers on the classification of birds are not numerous. The following are the titles of some of his publications on the subject:

- 'Descriptions of New Species of Birds from West Africa.'
- 'Notes on a certain Species of Birds from Malacca.'
- 'Many other papers on birds and their habits.'

During his life Mr. Strickland was engaged in preparing a large work on the synonymy of birds, one volume of which has been published since his death.

Mr. Strickland, during his geological researches, had attracted his attention to the mollusca, and numerous papers on the recent and extinct forms of the Mollusca attest his knowledge of this department of natural history. With his great knowledge of the detailed facts of the natural history sciences it is not matter of surprise that he took a deep interest in classification. He proposed at one of the meetings of the British Association for the Advancement of Science the appointment of a committee for the purpose of reforming the nomenclature of natural history.

He entered the army, and which has been extremely useful in establishing clear rules for the nomenclature of zoology.

STURGEON, William, distinguished as an electrician, was born at Whittington, in the county of Lancaster, in 1783. His parents were in humble circumstances, and he was at first apprenticed to a shoemaker; he subsequently entered the militia, and afterwards the Royal Artillery as a private soldier. It was whilst thus engaged that his taste for scientific pursuits commenced, and he employed his leisure hours in making experiments more especially in electricity, and the discovery of galvanism, Arago, and Ampère, in the newly-created sciences of magneto-electricity and electro-magnetism, and was soon enabled to suggest a modification of Ampère's rotatory cylinders. In 1824 he began to publish the result of his researches, and in that year four volumes of his paper on the 'Electricity and Magnetism' were published in the 'Philosophical Magazine.' In 1825 he presented a paper to the Society of Arts which was published in their 'Transactions,' describing a complete set of electro-magnetic apparatus of a novel kind. This apparatus was remarkable for attaining a larger amount of power in a smaller bulk than had been hitherto attained by any other arrangement. For this invention he obtained the large silver medal of the Society of Arts and a purse of thirty guineas.

Soon after the invention of the electro-magnetic machine, Mr. Sturgeon drew attention to the powerful effects to be obtained from the use of soft iron in the construction of the electro-magnetic apparatus. The soft iron horse-shoe magnet that was employed was the constant companion of the electro-magnetic machines since that time. Mr. Sturgeon subsequently directed his attention to the construction of plates for the various kinds of galvanic batteries. In his 'Experimental Researches in Electro-Magnetism, Galvanism,' &c., he directed attention to the superior properties of amalgamated plates of rolled zinc over the unprepared cast zinc before generally used. His method of dipping the zinc plates in acid, and afterwards in mercury, is employed to this day in the majority of galvanic machines. He subsequently suggested many modifications in the form and method of application which are now in daily use, and his name is inseparably connected with the mechanical application of the principles that had been worked out by Oersted, Faraday, and Ampère, since the beginning of the present century. Mr. Sturgeon for some years occupied the chair of Experimental Philosophy in the Hon. East India Company's Military Academy at Addis-
combs. During the latter part of his life he filled the office of Lecturer on Science at the Royal Victoria Gallery of Practical Science at Manchester. He died at Manchester in the month of December, 1850.

STURM, JACQUES CHARLES FRANCOIS, the discoverer of the celebrated theorem which bears his name, was born in the city of Paris on November 25, 1803, and was educated at the College de Jarente, Strasbourg, in the middle of the last century. After completing his school education and his classical studies at the college with remarkable success, he became in his fifteenth year a pupil of the Encyclopedic, where he made rapid progress in the study of mathematics and philosophy. The sudden death of his father, leaving his mother and four children, of whom Charles was the eldest, without any adequate maintenance, compelled him, before the close of the year 1818, to resort to public charities for the support of himself and his family, and three years afterwards he was recommended as tutor to the son of Madame de Stael. At the close of the year 1820 he accompanied his pupil to Paris; and though he shortly afterwards returned to Geneva, he found no sufficient occupation there, and he finally resolved, in company with his intimate friend and school-fellow, M. Colladon—the present distinguished professor of physics at Geneva—to seek his fortune in the French capital. Sturm had already become famous to mathematicians by several articles in the 'Annales des Mathématiques' of M. Gergonne, published at Nimes, on different branches of analysis and geometry, and the stimulating recommendation which he received from M. Lhuillier, and the kind offices of M. Germain, an eminent teacher of mathematics at Paris, made them known to Ampère, Fourier, Arago, and other eminent members of the Institute of Sciences, who recommended them to participate in the 'Memoires pour servir a l'Education des Étrangers,' vol. v., published, agreeably to the very inconvenient usage of the Academy, eleven years afterwards, in 1838.

The determination of the number of real roots of a numerical equation which are included between given limits, is a problem which had occasioned the attention of the greatest analysts of the past age—of Lagrange, of Laplace, and more especially of Fourier, who of all other analysts had made the most remarkable and practical, though he had failed in its theoretical, solution. The attention of Sturm had been for some time directed to this class of researches, which he pursued with remarkable continuity and diligence, encouraged, or at least interested, by the instructions and advice of M. Arago, and of the latter his own professor. This was the discovery of the theorem which will be for ever associated with his name, and which conquered the difficulty that had embarrassed all his predecessors, and thus permanently extended the dominion of analysis. [Sturm's Theorems.]

The memoir which contained this important theorem was presented to the Academy on the 23rd of May, 1829, supplementary papers being read at the following meetings; and immediately, without contest, its author was honored and rewarded for his labors. His connection with the French Academy enabled him to give an immediate account of his method to the world ('Bull. Univ. des Sciences Math. Phys. et Chim.,' vol. xi. p. 416, art. 271, 272, 273). The paper itself was not published till the year 1835, in the 'Mémoires des Savants Étrangers,' vol. vi., where it appears without a date.

In the course of a few years he was chosen a member of the principal scientific societies of Europe: he was elected a member of the Royal Society of London; the Académie was the successor of Ampère in 1836; in the same year he was made Professor of Mathematics at the Collège de Jarente, upon the special recommendation of Arago, at the Collège de Jarente, in 1838, and in 1840 he was appointed to succeed Poisson in the chair of that subject. In 1844 he was elected, by a foreign member of the Royal Society of London, and received the Copley Medal, for his valuable mathematical labours in the solution of a problem which has baffled some of the greatest mathematicians that the world has produced. [The first announcement of the theorem in the English language was not made until 1855, when Professor J. B. Young, of Belfast, inserted the substance of Sturm's memoir in his work entitled 'The General Theory and Solution of Algebraical Equations,' published in that year. The first intimation of it had reached him in the spring of May, 1840, when he had copied out and dispersed a dispassionate comment of Lacroix; he thought the discovery of sufficient importance to justify the destruction of many pages of his manuscript prepared for the printer, and the suspending of the press. 'The theory of Sturm's membrane should be published.' This he received in July, and his own work was published in August. To the appreciation and real of this analyst, whose recognition and promulgation of the value of Sturm's labours were thus both immediate and simultaneous with the publication of his own membrane, himself, were greatly indebted. In the preface to his Mathematical Dissertations' (one of which is devoted to the theorem) dated November 25, 1840—only five days before the presentation of the Copley medal—he adverts to Sturm's discovery as at that time existing considerable interest among analysts, as well in this country as on the continent; and he then expresses his own estimation of it in the following terms; 'I believe that I have already contributed somewhat towards bringing Sturm's work into more conspicuous and more favorable notice in Great Britain, and that it has been sufficiently praised by M. Germain, a former editor of the Academy's Reports, and by M. Lajous, a former writer upon Analysis, as well as by M. Caillet, the editor of the Journal des Mathématiques, and by M. Lacroix, in his Mathematical Dictionary.' In Young's subsequent introductory volume on 'The Analysis and Solution of Cubic and Biquadratic Equations,' published at the beginning of 1842, he invited the attention of the young analyst to the analytic solution of the problem of Sturm's former work on equations,—entitled 'The Theory and Solution of Algebraical Equations of the Higher Orders,'—which appeared early in the following year, is chiefly devoted to the analysis and development of that method and the previous theories of Biquadratic Equations, which were treated as mere applications of his own theory to the determination of the number of roots of the equation.

In France it was not without some difficulty that the substantial rewards of his scientific achievements were obtained; he was a foreigner, and naturally placed at a disadvantage in a contest with national competitors. It is right to consider his not being honorably rewarded both for the honour of France and as a proof of the very high reputation which Sturm had attained. The subsequent memoirs of Sturm, whether first presented to the academy or not, were chiefly printed in the journal of M. Liouville. Two of these memoirs, relating to the discussion of differential and partial differential equations, such as present themselves so commonly in the solution of the more important problems of mathematical physics, possessed a merit so extraordinary and so general, that the academy was at last declared, at a time when he was himself a competitor with Sturm for a place in the Academy, that 'impartial posterity would place them by the side of the finest memoirs of Lagrange.'

Of these two memoirs was presented in 1833 to the concours for the great prize of mathematics, to be awarded by the Academy in 1834 for the most important discovery in that science made known within the preceding three years. The academy conferred the prize on Sturm—not for the memoir which he had submitted to the judgment of the commission, but for that which contained his celebrated theorem and which had been presented in 1829. Other memoirs relate to optics, mechanics, pure analysis, the theory of functions of several variables, the theory of surfaces, the theory of quadratic forms, among other questions which have been treated in those several branches of science. One of the latest of these was a communication to the academy on the theory of vision, and is remarkable both for its geometrical and analytical elegance with which many questions subordinate to the theory are treated in it. It confirms generally,—with one important exception relating to the asserted muscularity of the crystalline lens and the changes attributed to its action,—the views of the late Dr. Young on the action of the lens. Dr. Young, the mathematician, has not been quite satisfied with the impression, as well as the extent of his knowledge as of his inventive power.

The health of M. Sturm, which had previously been remarkably vigorous, began to decline in 1851, probably in...
consequence of his laborsious public employments and the unmitting severity of his studies. He died on the 15th of December 1855, to the deep regret of a large circle of friends and pupils, to whom he appears to have been singularly endeared by the modesty, truthfulness, and simplicity of his character.

STURMIA, a genus of plants belonging to the natural order Orchideae and the tribe Malandreae. It has a petal perianth; lip anterior, erect or oblique, entirely, dilated, much larger than the side-lips, thus lengthening the side-lips. The lip is entire, but with an appendage consisting of two tubercles; anthers terminal, d-ciciduous, moveable like a lid, with two distinct cells; column elongated; germen on a twisted stem.

S. Lecotii has the leaves oblong-lanceolate; stem triangular; lip obovate, longer than the petals; flowers from 6 to 12, in a lax spike, yellowish in colour; the sepals lanceolate; petals linear; the hypantherium is large, ovate, inclosed in the whitish sheaths of the decayed leaves. It is the type of some authors. It is found in sappy bogs in Norfolk, Suffolk, and Cambridgeshire, but is very rare.

(Rabington, Manual of British Botany.)

STYRACINE. [Chemistry, s. 2]

SUCCESSION DUTIES. For many years persons succeeding to personal property (including leaseholds), whether they took by will as executors or legatees, or merely as administrators or next of kin, were charged with Legacy Duties. The duty was assessed on the property, whether real or personal, according to the estimated gross value of the personal property of the deceased. The legacy duty was chargeable after the estate of the deceased had been settled, and the stamp duty was to be paid on the settled estate. The duty was paid by the successor, and the property was subject to the settlement duties, and the duty was charged on the property at the time of settlement. The duty was chargeable on the property at the time of settlement.

SUE, EUGENE, the popular romancist, was born at Paris Dec. 10, 1804. His ancestors, who came from Lapalme, near Cannes, in the south of France, settled in the French capital at the beginning of the 16th century, and having made a fortune by trade, left it to their posterity. A number of respectable physicians, two of whom becamecelebrated, and enjoyed a very extensive practice. Joseph Sue, his grandfather, and Jean-Joseph Sue, his father, are both mentioned with honourable distinction in the national biographies of France. The latter, who had been principal physician to the Hôtel de la Marine du Roi, and anatomical lecturer to the École Royale des Beaux Arts, during the reign of Louis XVI., was one of the household physicians to Napoleon I.; and his son, Eugene Sue, was the original of the poet at the font by the Empress Josephine and her son Eugene Beauharnais, from whom he derives his Christian name.

Dr. Sue, having but two children—a son and a daughter—was desirous of bringing up his son to his own profession, and the latter was proposed for his name and fortune, as well as at the schools of Paris; and, thanks to his father's position and influence, was enabled at the age of twenty to enter a company of the Royal Body Guards as aide-major.

He was soon after transferred to the staff of the French army preparing to ent-r Spain under the Duke of Angoulême. In this campaign he was present at the siege of Cadiz and at the Tucacadero in 1822. In 1825 he quitted the land for the sea service, visited America, Asia, and the coast of the Pacific, and the islands of the South Seas, which he has since described with indisputable power in his earlier tales. He was present in 1828 at the battle of Navarino, on board of the frigate Louise, and after his father died at the age of sixty-nine, leaving to his son an enormous estate of 40,000 francs (1600l.) a year, besides a splendid museum of anatomy, valued at several thousands more, bequeathed to the nation. Eugene Sue, at this time in his thirty-sixth year, and the first of his line who had ever been the head of a family, his family having acquired so much distinction, and to which he owed his fortune. His taste inclining to art, he became a painter, and in that vocation entered the studio of Gudin. At the same period he felt an ambition to signalise himself in literature, and this was gratified by the insertion of some slight articles in the journal recently established by Emile de Girardin—Le Voleur. Encouraged by this success, he began to write tales descriptive of sea adventures, publishing in 1830 his "Maman de Poivre" and "Salamanche." The two former were rejected by the trade, he therefore published them at his own risk. In 1832 he had already become popular both with publishers and their subscribers. But it would be quite a mistake to suppose that this success was due only to the talents of the author. A man at that time could repudiate it more; wherever he went he was loud in denouncing it. His father's name and his private fortune gave him access to the best company; he selected the highest for his cultivation, and lived among the old families of France.

Sue was one of the first to try his skill in framing those historical romances which the genius of Sir Walter Scott had rendered so universally popular. A new market had been opened for the purchase of historical novels, and Sue was quite a success. He could, as the saying is, supply the public with the first volume on account of the name, and refused to buy all the other volumes on account of the work. From 1833 to 1840, Eugene Sue had confined himself to the narrative; he had written nothing else. He was conscious of this, and he emulated, if not to rival, Fenimore Cooper in sea adventures, and Sir Walter Scott in historical delineations. But at this period the novels of Balzac in France, and those of Charles Dickens in England, had created a taste for the novel of real life, or as the French call it, le Roman de Mœurs. He therefore resolved to adopt the new style, and to this change we owe 'Arthur, the Hôtel Lambert,' and 'Mathilde,' published in 1841 and 1842. Making allowance for those licences in morality which are so frequently found in the current French fictions as well as dramas, there is a skill in the combination of the plot, and a power of description in the incidents, in 'Mathilde,' which his earlier tales did not prepare the reader for. The highest critical authorities have never been more voluminous in their praises. It is the highest and superior novel. It was in this work that Eugene Sue first started that idea of the moral Howard, going about scourging the poor, redressing wrongs, and obliterating the wicked, which he developed afterwards in the 'Mysteries of Paris,' and the 'Engineer's Dream' during the Republic. Of the latter, the whole of the four years from 1843 to 1846 was taken up with these baleful writings, and the ferment and agitation of the public fancy was excited to the highest degree, without repose or relaxation. The original terms of this novel each week were 1,000 francs (400l.) but it is understood that they were purposely extended and developed, on account of their unprecedented success, and much larger sums allowed for them to
The author. They were afterwards republished in volumes, going through many editions, and being translated into most living languages. "Martin, l'Enfant Trouvé," appeared in 1846 in the form of "Sloths," and "Les Deux Pêchés Capitaux," in the same paper in 1847-48. Perhaps the most serious censure passed on his writings was that passed on this last by the author himself when he said in a bravado, "that he would show the fair side of all these sins;" for "they contain the sentiments of the whole town, and in nothing else but an apology for each and all of them. The first of these tales—"Pride"—is perhaps the masterpiece of Eugène Sue; the second tale—"Envy"—contains one very dramatic scene; but his "Avarice," his "Sloth," &c., are unworthy of his reputation.

The Mystères du Peuple," published in 1858, is the last fiction of any note produced by the pen of this voluminous writer. It is intended as an exposure of all the misery and injustice to which the common people of every country have been reduced in all ages of the world. After the Revolution of Feb. 1848, Sue, who had abandoned his early conservative principles for extreme democratic and socialistic ones, was elected a representative of the Assemblée Nationale; but his election of Napoleon III. he took no part in politics. He died at the age of 62.

SUGAR. [Tissues, Organic, S. 1.]

SUGAR-CANE. [Saccharum.]

SULPHARIN. [Chemistry, S. 1.]

SUMMARY JURISDICTION. [Justices of the Peace, S. 2.]

SUN-DEW. [Drosera, S. 1.]

SUN-ROSE. [Helianthemum, S. 1.]

SURGERY. Some references which have been made in other parts of this work will here be made good. Anus Fistula. One of the most frequent diseases of this part of the body is that which is commonly known by the name of Fistula, or Fistula in Ano. This disease consists of a fistula or sinus by the side of the rectum. It sometimes opens externally, without communicating with the bowel, and is then termed an anal and external fistula. It more frequently communicates with the bowel, without opening externally, and is then called blind internal fistula. Usually, however, these sinuses have an opening internally and externally, and the disease then constitutes complete fistula. In this latter form pus, flatus, and faeces may be discharged from the openings. It is accompanied by heat of the parts, great discomfit, and sometimes pain and spasm of the sphincter muscles. It is sometimes attended with acute inflammatory catarrh of the ano and the greatest pain.

When this kind of ulcers occurs, the healing is prevented by three circumstances:—1. The fistulous condition of the cavity. 2. The presence of foreign matters. 3. The frequent motion of the part by the action of the neighboring muscles. This disease originates most frequently in the interior of the bowel by a small ulcer, which, extending, at last produces a second opening. It is often found in persons labouring under pulmonary consumption, and its persistence and inconvenience are increased by the constant cough which accompanies that disease.

The treatment of fistula is simple, and usually very successful. By laying open the whole of the sinuses and dividing the bowel, the pain subsides, and the patient obtains to the cure of this disease are removed. The mode of operating in this case is simple. A grooved probe is introduced into the external opening until it passes out at the internal opening. A probe-pointed bistoury is then introduced along the groove, and the sinus is ligatured throughout its whole length. Usually no important vessels are divided in this operation, so that all that is necessary after is to introduce a slight dressing of lint. An opiate should be given after the operation. A fistula or sinus will consist in an enlarged condition of the veins supplying the fistula, which are divided by the process, in two kinds, external and internal. It seldom occurs before puberty, and is more common in females than males, and in the rich and luxurious, than in the poor and humble.

The fluid which is derived from the vein, or whatever tends to become blood to the lower part of the rectum, and to retard the return of blood from that part, favours piles. Thus they occur in pregnant females, in persons troubled with habitual constipation, abdominal tumours, obstructions in the portal system of veins, and in those who lead sedentary lives or who feed too well.

External piles consist of the congeries of varicose or enlarged veins, which are surrounded by a condensed and enlarged connective tissue, and are covered partly by mucous membrane and partly by loose ragous integument. The parts are sometimes inflamed, at other times free from any capillary development. This condition of the veins is such that it becomes ulcerated. It is under these circumstances that the coats of one or more of the veins give way, and they bleed to a greater or less extent. When this does not take place they do not bleed. These two states are called respectively bloodless and bleeding piles.

The treatment of this form of piles may be either palliative or radical. The radical cure consists in removing the part either by the scissors or bistoury, and leaving them to heal in the ordinary way, or a ligature may be passed round the enlarged vessels, and the strangulated part of the bowels. When this operation is not thought desirable, much may be done to relieve the enlargement and pain of piles by a palliative treatment. Whatever will remove the loading of the vessels in the lower part of the bowels will relieve them.

Some piles may be divided into three kinds:—1. Varicose veins surrounded by enlarged connective tissue, and covered by mucous membrane, and bleeding or blind. 2. Tumours of the nature of sarcoma. 3. A congeries of blood-vessels resembling erectile tissue, and occurring in the subcutaneous and peri-membranous parts. It is called complete when the vessels are acted on. When the tumours are replaced, no great inconvenience occurs. If, however, the bleeding continues, the patient becomes pale, thin, and weak; noises in the ear, light-headedness, and palpitation of the heart come on, in fact the symptoms are those of a serious internal disease.

The treatment in this case may be either palliative or radical. Frequently the latter course should at once be resorted to. The internal tumours are seldom of a kind to allow of the depressor ligature; it is therefore the safest process. When the base of the tumour is small, it may be pulled down by a tenaculum and a single ligature placed round it; but when the base is broad, a needle with two ligatures is passed directly through the tumour, and ligatures are passed alternately in each until the base is reduced. The cautery is of very little value; the first application is very painful and difficult, and wherever circumstances will admit is greatly facilitated by the use of chloroform. After the operation opiates should be given.

Nitric acid has been recently recommended in these cases, but unless the tumours are small, and the cases slight, the remedy is liable to fail, and after the infliction of much pain the operation must be had recourse to. Should the palliative be had recourse to, all efforts should be made to enclose the head of external piles, must be attended to. Astringent remedies and opiates must be injected into the bowels. The bowels must be regulated, the liver looked to, and the lahmorrage is considerable, gallic and tannic acid, with acetate of lead, may be administered. Protopsins Anis is a very frequent and troublesome affection of the lower bowels. In consequence of relaxation the rectum passes down, and becoming exerted protrudes beyond the anus. This protrusion may be either partial or complete. When the whole part of the bowels comes down, and partial when the mucous coat alone descends. The latter is the most frequent, and sometimes accompanies internal piles. Children and old persons are more liable to the complete form. The quantity of mucus is increased from the former annular enlargement to a tumour as large as a child's fist. It is sometimes accompanied with inflammation, and the
mucous membrane throws off a coloured discharge. Great pain and uneasiness are often felt, and general languor and debility are present.

Acute Arteritis. The treatment is either palliative or radical. When this disease depends on general constitutional weakness, tonics, change of air, and a proper regimen, will restore the patient to health. The bowel should always be returned as speedily as possible, and the bowels should be kept open by the use of unctuous lubricating the parts. When they are softened, leeches should be applied and rest secured before attempting reduction.

The radical cure is effected by removing one or more of the redundant folds of the mucous membrane by the knife or ligature. If the disease is at the base, the removed parts, or the bowel may be left intact, and a portion of the redundant external integument may be removed, which by its subsequent contraction prevents the painful protrusion.

Imperforate Anus. Children are occasionally born without an anal orifice. Three forms of this malformation are described: 1. The rectum may be fully developed, and have its orifice closed by an external membrane, or a septum may be developed at some distance from the orifice. In the treatment of this form of imperfection, it is no longer required than an incision through the obscuring membrane. 2. The rectum terminates at some distance from the perineum, and there is a mere depression where the anal orifice ought to be. This is the most common form. It is more serious than the former. The membrane should be allowed to accumulate, and pressure being made on the abdomen, an incision must be made down to the bowel, and a passage thus established. 3. In this form the rectum is very small, and the anterior wall of the cavity last may be performed, and failing this, an attempt may be made to form what is called an artificial anus. This operation is performed not only for imperforate anus, but in cases where, from tumors, or the impaction of foreign matters, the fecal matter is condensed and becomes obstructed, the sigmoid flexure of the colon is the part which is preferred for this operation. It may be reached from before or behind. The former is the easiest operation; the latter is the most convenient position for the new opening to the patient. In performing the latter operation, an incision is made midway between the last false rib and the crest of the ilium. The colon is then secured, an incision made into it, and the edges of the bowel brought in contact with the external wound by means of ligatures. This operation, has been successfully performed at the age of one year, and with the result of the imbecility of the lower bowel. In children with imperfect anus, however, it seldom succeeds, as other malformations often exist which speedily terminate the life of the patient.

Acute Arteritis, is either limited to a particular spot, or it spreads along the course of the artery. When limited, this disease arises from external injury, and is a common result of wounds and ligatures. In the milder forms, this inflammation is attended with the exudation of a plastic matter, which fills up the artery and leads to its obliteration, a result which is sought for in the application of a ligature to arteries. The inflammation may, however, proceed to suppuration and ulceration, when the coats of the artery are opened and the blood escapes. In the latter operation, an incision is made midway between the last true rib and the crest of the ilium. The colon is then secured, an incision made into it, and the edges of the bowel brought in contact with the external wound by means of ligatures. This operation, has been successfully performed at the age of one year, and with the result of the imbecility of the lower bowel. In children with imperfect anus, however, it seldom succeeds, as other malformations often exist which speedily terminate the life of the patient.
tures with that of the abnormal vascular cells. Also in the neighbourhood of the trunk the blood-brain barrier is broken down, and the leucocytes can pass through it, and obviously carrying on a plentiful and active supply." (Miller, "Practice of Surgery.") Such is the nature of those tumours which partake of the character of true erectile tissue. Like the normal erectile tissue, also, these become enlarged and diminished in size, according to the singleness or activity of the blood circulating through them. They are compressible, elastic, and of a reddish hue. They are usually subcutaneous, but they are sometimes intramural. The most common symptoms are pain in the region of the head, neck, back, and buttocks. The tumour pulsates synchronously with the heart, and may be considerably diminished in size by pressure, but resumes its usual condition when the pressure is removed. On occasion the tumour is so soft and dull and rough, sometimes accompanied by a vibratory thrill.

Ureteral calculus is likely to occur in these tumours, and lead either to great haemorrhage or their cure.

Erectile tumour may be treated in three different ways:—

1. The tumour may be removed. This is always better done by the ligature than by the knife.

2. The tumour may be starved by diminishing the arterial supply. This is performed either by the application of a ligature to the artery or arteries which supply the tumour with blood.

3. The structure of the tumour may be changed. This may be effected in various ways: as by pressure, the introduction of a catheter, the application of a hot bladder, nitric acid, or other agent. A hot needle may be run through, or a wire connected with the poles of a galvanic battery may be passed through the tumour. All these plans have been found to succeed with small erectile tumours.

A tortuous and dilated condition of the arteries frequently occurs in the smaller arteries, and produces a painful tumour. It may be removed in the same manner as varicose veins.

Any operation applied to the opening of an artery for the purpose of drawing blood, as phlebectomy is applied to the same operation in a vein. When it is thought desirable to take blood in large quantity and with much rapidity, it is better taken from an artery than from a vein. This operation however is more difficult to perform, and may be attended with ulterior consequences. Hence phlebotomy or venesection is always preferred, except under urgent circumstances, as the means of drawing blood from the system. When arteriotomy is performed for the sake of blood-loss, the operation is rendered imperative by the nature of the temporal artery, which is generally selected. In this position the wound is easily healed afterwards by pressure. The accidental wounding of an artery, as is sometimes the case in battle, causes in the arm, may lead to false aneurism and the necessity of placing a ligature round the wounded artery. Sometimes false aneurism follows arteriotomy in the temporal artery, and in this case it becomes necessary to ligature the arteries on each side of the wound. Sometimes on removing the compress after arteriotomy, an ulcer is found to be formed. If the ulceration spreads, the vessel may be opened and haemorrhage occur. In this case also the artery must be tied.

BLADDER, DISEASES OF. This bladder, like every other organ of the body, is liable to inflammation. This disease is called Cystitis. When present there is pain and tenderness in the region of the bladder, also in the region of the perineum and <insert>...> the urethra. The urine is voided very frequently. The bladder may be distended above the pubes, there is dulness on percussion there, and pressure produces great pain. Sickness is frequently present, the pulse becomes rapid, the skin hot, and at last symptoms of the absorption of the urine present themselves, and unless relieved, the cases become fatal. In the other case, tonics and other remedies necessary for the debilitated state of the system must be employed. Generally, however, little can be done, and cleanliness and the use of urinals are the only means left.

Retention of Urine. This arises from various causes, and the treatment must vary accordingly. The symptoms in all cases are, an inability to evacuate the urine, whilst the desire to do so is constant and frequently accompanied with pain. When the desire is experienced and urine relieved, the bladder becomes poisoned by the urine. All these symptoms are removed by the removal of the urine. This may frequently be done by the catheter, but the disease can only be permanently cured by the removal of the cause.

The following are some cures and measures of this disease.

of these cases a special treatment is necessary, but in all it should be remembered that fatal results will occur unless the diseased viscus is emptied of its contents. It often happens that for this purpose the catheter cannot be passed into the urethra; under these circumstances the only means left is to puncture the bladder. This operation may be performed from the perineum, the rectum, and the pubes. In puncturing the bladder from the perineum an operation is performed that is perfectly innocuous, and without risk. When this operation is deemed advisable, the bladder may be reached from the rectum and punctured here. It is only when these two methods are found to be impracticable, that the operation on the perineum, the abdomen in the region of the pubes has recourse to. These operations are not often performed: "but any one of them is much preferable at any time to postponement of relief, and consequent disaster by extravasation; and all, too, are preferable to passing a cat-tail catheter, by sheer force through an impassably strictured urethra." (Miller.)

Diseases of the Prostate. The prostate gland is liable to the various diseases of other parts of the urinary organ. It may be inflamed, or abscess may occur in it, or it may be subject to malignant disease. It is, however, most liable to enlargement or hypertrophy, which is one of the most troublesome and frequent diseases to which old age is liable. The causes of this hypertrophy are, first, local, due to result of inflammatory action, and the other is an enlargement independent of that process. The first is only temporary, and may be frequently speedily removed by treatment. It is the result of structure, gleet, affection of the rectum, as in the distended bladder, and of the pugilistic, the recumbent position, and counter-curritants, are the proper treatment. The second form of enlarged prostate is more difficult to manage. It is one of the consequences of increasing age. The enlargement in these cases may be partial or general. One of the most painful consequences of either is a difficulty in passing the water. This comes on gradually, and is also attended with difficulty in emptying the rectum, as this organ is pressed on by the distended prostate. In the early portion of the disease, empty the bladder more frequent, and the act is less perfectly accomplished, and a portion of residual urine remains in the bladder behind the enlargement. Under these circumstances the bladder becomes irritable, and chronic cystitis is established. The symptoms of this disease are then added to those of the enlarged prostate.

There is no cure for this state of things, and the treatment is consequently palliative. Much, however, may be done for the comfort of the patient. All excess and imprudence in diet must be avoided. Milk, eggs, and fish, which are rich in blood, must be maintained as much as possible. The bowels regulated by onuncata and gentle aperients. Opium, iron, mineral acids, and tincture, may be given according to circumstances. In order to prevent distension the catheter may have recourse to, and the water drawn off occasionally.

Breast, Diseases of. The mammary gland, especially in the female, is liable to various diseases, requiring the attention of the medical man.

Irritabla Mamma. In both married and unmarried females the breast is liable to irritation from sympathy with other parts of the system. In these cases there is often great pain and uneasiness in the breast, and the whole system suffers more or less. The breast was swollen and red in the external elevation of the mamma. The pain is sometimes intermittent or periodic, similar to neuralgia. When the general health is affected this must be attended to. Opium and belladonna may be employed internally, and nitrate of silver, bismuth, and aconite, have been recommended externally.

Mammitis. Inflammation, acute and chronic, of the substance of the mamma is not an unusual disease. It causes great suffering, and is common during the period of lactation. The pain is intense; the breasts are swollen, and tender to the touch. From the first there is a tendency to suppuration. The secretion of milk is perverted and arrested. In the treatment leeches and warm fomentations are used. When the body is wet, the bowels should be kept open, and the fever subdued. When matter forms it should be early evacuated. A chronic inflammation is sometimes observed. When this is the case stimulant applications to the breast will be found useful. Where this is attended with abscess it should be opened, so as to give free exit to the pus, and pressure applied. 

Tumours of the Breast. The breast is subject to various kinds of partial and general enlargement. The "chronic mammary tumour" of Sir Astley Cooper consists of a partial hypertrophy of the gland. Enlargement of the whole gland also frequently takes place. These enlargements may be got rid of by pressure and treatment of the general health. The tumours may be of the nature of cysts, abscess, hydatids, and malignant tumours. In many of these cases it may be necessary to remove the breast. This is done in the following manner: "The patient having been placed recumbent, and duly anesthetised, the arm on the affected side is raised and held by an assistant, as to stretch the pectoralis major and facilitate incision. The knife is entered in the axillary aspect of the tumour in a line with the mamillo, and is moved in a semi-elliptical direction towards the opposite point; a similar proceeding is adopted—above or below, as the case may be—to complete the ellipse, and the size of this space necessarily varies according to the extent to which the integument seems to be involved, and according to the natural latticiness of the parts. It is a fault to take away an undue amount of sound tissue, for it interferes with the effect of the incision in effecting and maintaining apposition of the wound; but it is a worse error to leave tailed parts, whereby reproduction of the disease cannot fail speedily to ensue. It is well to make the lower incision first, otherwise its course and position are apt to be uncertain. In case of a second tumour it is best that, after the knife is sloped through the subcutaneous part; and regular dissection is proceeded with from the axilla downwards, dividing the principal vessels and nerves at once, and so rendering the subsequent steps of the operation comparatively bloodless and free from excess. The absence of the organ, with its hinder of comparatively sound tissue, in the case of malignant tumor, having been removed, is carefully examined on every aspect by both sight and touch; and, if need be, a portion of the organ, to the extent of the removal. If the perforation is to be feared, the wound is brought together and treated in the ordinary way."

Much has been written of the removal of malignant tumours, especially of the breast, by means of excisions. It is always difficult to decide exactly as to whether a tumour is malignant; and from all that has hitherto been made known of these formations, it would appear that, if they are cured by general or local treatment, the inference is that they are malignant. Without the aid of histology, or the evidence is very decisive that we possess no internal remedy that has any known influence over the progress of those tumours which are truly malignant. A recent American writer has expressed a decided opinion that the presence of the disease should be confirmed, by removal as a general and local treatment, which has been undertaken with success, and reported on in this country. The cases referred to were treated at the Middlesex Hospital. The general treatment consisted in the administration of iodide of arsenic and the Sanguinaria Canadensis. The local treatment consisted in the application of the Sanguinaria and chloride of zinc. The method employed was to make a decoction of the Sanguinaria, and, with an equal quantity of the chloride of zinc, to make the whole into a paste with common flour. This was then applied to the incisions, and the wound surrounded with zinc paste, which was continued from two to three weeks, till the whole depth of the tumour was penetrated and removed. When this was effected the application of the paste was discontinued, and the wound allowed to get well. The Sanguinaria seems to exert no effect in this condition of the disease. With the chloride of zinc however, the following passage concludes the report of the surgical staff of the Middlesex Hospital on this mode of treating malignant tumours: — "The last peculiarity of this treatment is the practice of incisions; but I may say in opinion that this is its only but its very great merit. The Sanguinaria is inert; the chloride of zinc paste was known before; but the incisions constitute a new feature in the treatment of cancerous tumours for which we find no parallel in the writings of the past, or in
the practice of present surgeons. Cancer in its constitutional nature remains as ruthless and as unassailable as ever.

SUSZMAMITE. [Mineralogy, S. 1.]

SWEDEN. In 1839, to which date the population was given in the previous article, it amounted to 3,109,772. The following table shows the increase, and also the läns or provinces into which Sweden is divided—

<table>
<thead>
<tr>
<th>Län</th>
<th>Area in Square Miles</th>
<th>Population December 31, 1865</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malmö</td>
<td>1,774</td>
<td>268,664</td>
</tr>
<tr>
<td>Christianstad</td>
<td>2,421</td>
<td>184,121</td>
</tr>
<tr>
<td>Hallstads</td>
<td>1,502</td>
<td>110,615</td>
</tr>
<tr>
<td>Karlshamn</td>
<td>1,130</td>
<td>111,239</td>
</tr>
<tr>
<td>Visby</td>
<td>3,771</td>
<td>143,707</td>
</tr>
<tr>
<td>Jönköping</td>
<td>4,374</td>
<td>146,660</td>
</tr>
<tr>
<td>Calmar</td>
<td>4,542</td>
<td>212,585</td>
</tr>
<tr>
<td>Linköping</td>
<td>4,209</td>
<td>239,601</td>
</tr>
<tr>
<td>Malmö</td>
<td>3,221</td>
<td>259,236</td>
</tr>
<tr>
<td>Venerborg</td>
<td>2,615</td>
<td>242,544</td>
</tr>
<tr>
<td>Göteborg</td>
<td>1,183</td>
<td>289,712</td>
</tr>
<tr>
<td>Växjö</td>
<td>1,222</td>
<td>165,983</td>
</tr>
<tr>
<td>Stockholm</td>
<td>2,689</td>
<td>171,193</td>
</tr>
<tr>
<td>Uppsala</td>
<td>2,695</td>
<td>99,228</td>
</tr>
<tr>
<td>Östergötland</td>
<td>2,650</td>
<td>289,241</td>
</tr>
<tr>
<td>Nyköping</td>
<td>2,497</td>
<td>123,868</td>
</tr>
<tr>
<td>Orebro</td>
<td>3,230</td>
<td>142,863</td>
</tr>
<tr>
<td>Karlskrona</td>
<td>6,516</td>
<td>232,221</td>
</tr>
<tr>
<td>Falun</td>
<td>12,609</td>
<td>183,736</td>
</tr>
<tr>
<td>Göteborg</td>
<td>11,007</td>
<td>274,608</td>
</tr>
<tr>
<td>Harnemo</td>
<td>2,451</td>
<td>114,158</td>
</tr>
<tr>
<td>Österbotten</td>
<td>19,553</td>
<td>65,988</td>
</tr>
<tr>
<td>Umeå</td>
<td>22,228</td>
<td>79,515</td>
</tr>
<tr>
<td>Piteå</td>
<td>22,563</td>
<td>60,186</td>
</tr>
<tr>
<td>Total</td>
<td>163,832</td>
<td>3,543,649</td>
</tr>
</tbody>
</table>

This area, increased by 3848 square miles of water not included in the läns, and the population column by 97,567, the number of the inhabitants of Stockholm, the capital of the kingdom, gives the total läns 195,351 square miles, and the total population 3,641,600.

Manufactures.—The industrial products of Sweden comprise vast quantities of linen, which is manufactured in most every house, woollen-cloth and other stuffs, refined sugar, tobacco, paper, leather, glass, some callicoes and other cotton goods, cotton twist, silks, china-ware, cast-iron, sailcloth, soap, spirits, beer, &c. Ship-building is carried on to some extent in most of the harbours of the Baltic.

Internal Commerce.—The internal commerce consists of corn, salt, and manufactured goods, especially the linens of Wenerborg’s Län, which are carried to the most remote parts of the country, is very considerable. This commerce is facilitated by the excellent roads, and in winter by the whole country being covered with snow for four or five months, which renders the conveyance of goods in sledges easy and expeditious. In summer a like advantage is derived from the navigation of the sea, which washes most of the provinces. The Trollecten Canal is navigated by a great number of barges, which bring down to Göteborg, for export, large quantities of iron and steel, and timber in planks and boards; and they carry into the interior corn, whisky, salt, herrings, sugar, butter, fish, wine, and some other articles. Large barges ply also on the other canals, conveying heavy goods of different descriptions, such as bar-iron, alum, corn, salt, herrings, and strömings, whisky, bricks, and tiles. A railway has been commenced, of which a portion, from Orebro to Arboga, with a branch from Dylla to Nora, was opened in 1858. It is intended ultimately to connect the Werner lake with the Malma lake, and thence with Stockholm, Arboga being a great entrepôt for iron.

Navigation and Foreign Commerce.—The Swedes are much given to sea-faring life. Their vessels visit most of the countries contiguous to the Baltic, and they are also employed in the carrying-trade between other countries, especially in the Mediterranean and on the coasts of South America. The mercantile navy at the end of 1855 numbered 2874 vessels (carrying together 126,326 lasts), exclusive of those carrying less than ten lasts; and 131 steamers. The total number of foreign (including Norwegian) ships that entered Swedish ports in 1855 amounted to 6733, carrying 290,880 lasts; the departures numbered 10,665 vessels, measuring 428,384 lasts. The imports were valued at

56,661,000 crowns; the exports at 58,598,000 crowns. The foreign trade extends to most countries in Europe and America. The chief imports are brought from the following countries, which are named in order of the values:—The Hane Towns, Great Britain, Brazil, Norway, Russia, Denmark, United States, East Indies and Australia, Prussia, and the West Indies. The best customers for Swedish exports are Great Britain, Denmark, the France, Prussia, United States, Russia, and Portugal.

The principal articles of export from Sweden are iron and timber. Norway takes a considerable quantity of iron, and sends in return. Stockholm receives from Finland the fourths of the fire-wood which it consumes, the northern provinces not being able to supply the article either so cheap or so good. Finland also exports to Stockholm meat, butter, cheese, bacon, flour, hides, pitch, and tar. Other articles of exports are copper, charcoal, tar, pitch, hemp, oil, paper, tree-bark, tobacco and snuff, bricks, furs, some linens, vessels, and some minor articles. The chief articles of import are: sugar, coffee, salt-fish, hides, cotton-twist, cotton in wool, woolen stuffs, linens, cottons, wines and brandy, wool, dye-stuffs, rahtas, almonds, pepper, cinnamon, arrack and rum, butter, bacon, tobacco, soap, tar, oil, ginger, lacquered ware, tea, tallow, potashes, and oil.

Education.—Sweden has two universities, Uppsala and Lund. The average number for the last two years was about 1000 students; at the latter, between 400 and 600. There are besides, 12 gymnasia for higher instruction, preparatory to the universities; 41 lardems skola, or grammar schools, and 40 apolo- logist schools, where the common branches are taught, with, in some cases, French and English. For primary education, the law of 1849 commanded the erection of a school in each commune or parish. Owing to the sparseness of the population this was found to be in many instances impracticable; in such cases however the communes are divided into districts, each of which is visited in turn by teachers or schoolmasters. Schoolmasters are trained by government and paid by the communes in kind. In 1860 there were 9107 stationery and 1351 amblatory schoolmasters. Of the masters, 218 were clergymen and 690 church clerks. In that year, 143,927 were employed in national and 112,900 in parochial schools, 156,175 in amblatory schools, 129,996 were instructed at home, 6233 in the secondary schools above named, and 17,468 in private schools, making a total of 432,388 altogether under instruction. It is a general practice in Sweden for parents, especially those who live in the country, to instruct their children in the long winter evenings.

Finance, &c.—The income of the state has been calculated for 1855 and 1857 at 14,566,300 crowns; and the expenditure for 1857 at 14,567,800 crowns; but in the budget proposed for 1858, 1859, and 1860, the receipts are set down at 24,527,800 crowns, and the expenditure at 24,517,800 crowns. These sums are for Sweden independent of Norway. The strength of the army and navy are stated under Military and Naval Forces. The present king, Oscar I, succeeded his father in March, 1844.

SWEET-SOP. [Agnacres.]

SWEET-WILLIAM. [Dianthus.]

SWIFT. [Swarows.]

SWIMMING-BIRDS. [Nataxes.]

SWITZERLAND. There is no material alteration in Switzerland, but the following to give the area of the different cantons, the number of their representatives in the National Council, and the population in 1860:—

<table>
<thead>
<tr>
<th>Canton</th>
<th>Area in Square Miles</th>
<th>Population in 1860</th>
<th>Representative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aargau</td>
<td>501</td>
<td>198,882</td>
<td>10</td>
</tr>
<tr>
<td>Appenzell</td>
<td>132</td>
<td>54,893</td>
<td>3</td>
</tr>
<tr>
<td>Basel</td>
<td>184</td>
<td>134,850</td>
<td>3</td>
</tr>
<tr>
<td>Bern</td>
<td>2,665</td>
<td>428,301</td>
<td>25</td>
</tr>
<tr>
<td>Freiburg</td>
<td>553</td>
<td>69,891</td>
<td>5</td>
</tr>
<tr>
<td>St. Gall</td>
<td>755</td>
<td>165,879</td>
<td>15</td>
</tr>
<tr>
<td>Geneva</td>
<td>91</td>
<td>64,416</td>
<td>2</td>
</tr>
<tr>
<td>Glarus</td>
<td>279</td>
<td>30,213</td>
<td>2</td>
</tr>
<tr>
<td>Grisons</td>
<td>2,562</td>
<td>89,893</td>
<td>3</td>
</tr>
<tr>
<td>Lucerne</td>
<td>416</td>
<td>138,194</td>
<td>30</td>
</tr>
<tr>
<td>Neuchâtel</td>
<td>250</td>
<td>76,743</td>
<td>2</td>
</tr>
<tr>
<td>Schaffhausen</td>
<td>115</td>
<td>35,308</td>
<td>2</td>
</tr>
<tr>
<td>Ticino</td>
<td>1,083</td>
<td>117,759</td>
<td>15</td>
</tr>
<tr>
<td>Unterwalden</td>
<td>262</td>
<td>28,198</td>
<td>2</td>
</tr>
</tbody>
</table>

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to construct free from that impediment. And, even whilst she was upon the stocks, she was considered to present such excellent qualities, that it was deemed Captain Symonds had already given sufficient proof of his skill in naval architecture to be entitled to the highest post and respectability that profession. In 1833 on the 9th of June, he was offered, and accepted, the office of Surveyor of the Navy, in succession to Sir Robert Seppings. This appointment was associated with the entire removal of restriction as to the amount of tonnage in the navy, and to the rights of the navy there had liberty for the exercise of judgment and talent in designing ships, which had not been granted to the commissioners or surveyors of the navy before: so that he might at once build ships of the highest conditions of excellence that both science and practice had yet indicated. This freedom from conditions in determining the dimensions of ships, was taken ample advantage of by him; having a great principle to bring out in practice, he applied it with a decision, which, in a short time, altered the general character and indispensable part of our navy. He had the merit of having boldly taken the lead in a path which future constructors, intending to carry on improvements in our ships, may pursue with the highest advantage. Considerable difference of opinion exists as to the value of the totality of qualities possessed by Captain Symonds’s ships; but it was remarked in 1849, two years after he had retired from office, that of the 180 vessels of different kinds, built during the period of sixteen years, for which he was surveyor of the navy, and all upon the same principles, he had been superior in construction, in form, than any shipman, as was originally adopted in the Pantalone, none had foundered.

Captain Symonds received the honour of knighthood in 1836. He had received the thanks of the Admiralty in 1830 for a memoir containing sailing Directions for the Adriatic Sea; and again in 1837, for “the valuable qualities of his several ships, and for improvements introduced by him into the navy;” he was elected a Fellow of the Royal Society on June 4th, 1838, and nominated a C.B. of the Civil division in 1848. In 1849 he was a Naval Commissioner on the retired list. He died, March 30, 1856, on his voyage from Malta to Marseille.

(O’Byrne, Naval Biographical Dictionary; Fincham, History of Naval Architecture, &c.)

SYNAPTE. [Class. Amebida, S. T.]

SYNAPTE, a family of Echinodermata, belonging to the order Holothuriidae. It is characterised in this order by the absence of suckers. It is represented in the British seas by the genus Chirobatia, which has a cylindrical and vermiform body, elongated tentacles, digitate at their extremities.

C. digitata has a vermiform body, white with orange spots, the tentacles long, punctuated, digitate. This animal was first found by Montagu on the shores of South Devon. It is a very rare and curious specimen in British Star-Fishes, says a writer on the subject, having never been seen a living specimen.

SYNAPTIDE. [Class. Amebida, S. T.]

SYNATHIDAE, a family of Fishes, embracing, according to some authors, the Pipe-Fishes, the Sea-Horses, and the Winged Sea-Horses. These forms are sometimes assigned to distinct families, as in the following definitions:

Syngnathidae, Pipe-Fishes. — Body prolonged, slender, linear, or angulated; mouth greatly prolonged, cylindrical, mouth terminal, vertical. Ventral fins absent; caudal fin wanting in some.

Hippocampus, Sea-Horses. — Head and body compressed; snout narrow, tubular; mouth terminal. Pectorals small; dorsal single; anal two or three.

Pogonias, Winged Sea-Horses. — Body broad, depressed; snout suddenly contracted, narrow, somewhat protractile; mouth terminal, beneath. Pectorals generally large; caudal fin small.

They all agree in having the endo-skeleton partially ossified; exo skeleton ganoid; gills tufted (hence the group is named Lophobothria), in the opercular aperture being small, and the swimming-bladder without an air-duct. We shall illustrate this family by a short description of the British species:

Syngnathus has the body elongated, slender, covered with a series of indurated plates arranged in parallel lines. Head long; both jaws produced, united, tubular. No ventral fins.

In certain of the species the males are furnished with an elongated pouch under the tail; these are called
TAL

TAHITI. [OTAHITI.]

Talfourd, Sir Thomas Noon, Knt., was born January 26, 1796, at Dockey, a suburb of the town of Stafford, where his mother was then on a visit. His birth was premature. His father was a brewer at Reading in Berkshire. His mother was a daughter of Thomas Noon, minister of a congregation of Independents in that town, to which seat his father also belonged. Thomas Noon Talfourd was educated at the grammar-school of Reading, under Dr. Valpy, for whom he always entertained an affectionate respect. In the year 1813 he was placed for legal instruction under Mr. Citty, the special pleader, and in 1818, was called to the bar. He collected a personal fortune by a year's escape from the egg the tail is covered with a fin-like membrane, and it also possesses pecoral fins. During their growth the caudal membrane and tail fins are not absorbed.

Hippocampus—The jaws are united and tubular, the mouth placed at the end. The body compressed, short, and deep. The whole length of the body and tail divided by longitudinal and transverse ridges, with tubular points at the angle of insertion; both sexes have pectoral and dorsal fins; the females only have an anal fin; neither has ventral or caudal fins.

H. breviceps, the Sea-Horse, or Short-Nosed Hippocampus, is occasionally met with on the British coasts. The habits of these creatures are very singular. When swimming about they maintain a vertical position, but the tail is ready to grasp whatever meets it in the water. It quickly entwines in any direction round weeds or other objects, and the angle of intersection: both sexes have pectoral and dorsal fins; at their prey with great dexterity. When two are together they often twist their tails together. Their eyes move independently of each other, as in the chameleon.

Pegasus has a smut as in the previous genera, but the month is under it, and movable. Two distinct ventral fins behind the pectoral, which are often large, hence the name of Pegasus, or Flying Horse. The species are found in Indian Seas.

(Tarrett, History of British Fishes; Adams, Manual of Natural History.)

SYNODUS. [SOPHOPA.]

SYRINGINE. [CHEMISTRY, S. 2.]

SYRINX. [SYRINCOIDEA, S. 2.]

SYSTEM, SEXUAL. [SEXUAL SYSTEM, S. 2.]

Mr. Serjeant Talfourd may be said to have added two valuable encomiums to the statutes of the realm—the Custody of Infants Act (2 & 3 Viet., c. 54), and the Copyright Act, which he first introduced in 1837, but which was strongly opposed, and was not passed into a law till 1842 (3 Viet., c. 45), when he was not a member of Parliament, and then in a modified form.

During all this period of legal and parliamentary activity Mr. Talfourd continued his labours in literature. He was for several years law-reporter of circuit cases for the 'Times' newspaper, and he continued to contribute to the 'New Monthly Magazine,' and also to the 'Retrospective Review,' and the 'London Magazine,' when he was called to the bar by the authorities of the Middle Temple, February 9, 1821, and in 1822 he married the daughter of John Towell Rut, Esq., of Clapton, near London, the editor of Dr. Priestley's works. He soon afterwards joined the Oxford Circuit. By steady application, rather than by any peculiar aptitude or liking for the law, he gradually rose in his profession. He was a fluent speaker, distinguished by feeling and fancy, more than by argumentative powers. After about ten years practice he applied for a silk gown, but his claim to the dignity at the bar was not entertained by the house of Commons, he therefore, in Hilary Term, 1833, assumed the gown, and became Mr. Serjeant Talfourd. He was also for some years Recorder of Banbury.

At the general election in 1835 Mr. Serjeant Talfourd was returned to parliament as one of the members for the borough of Reading, Mr. Fyafe Palmer, the previous liberal member, having retired. In 1837 Mr. Palmer again came forward, and was returned with Mr. Talfourd. At the next election two conservatives were returned, and Mr. Talfourd was out of parliament from 1841 to 1847, when he was again returned for Reading, and retained his seat till July 1849, when he vacated it on his being appointed successor to Mr. Justice Colman in the Court of Common Pleas, on which occasion he also received the honour of knighthood. As a member of the legislature
depth of emotion, and truthfulness of thought and expression. They may be rather regarded as dramas of poetic sentiment and description. The blank verse is smooth, graceful, and "in linked sweetness long drawn out," but all the grandeur of its language and the wealth of its forms are obscured by the redundancy of the diction.

In 1837 Mr. Tarlton published the "Letters of Charles Lamb" and "Sketches of a Country-house in Staffordshire," which was followed, in 1843, by "Anecdotes of the Life of S. 1844, after the death of Lamb's sister, he published "Final Memorials of Charles Lamb," consisting of Letters, 4to, 2 vols. 8vo, a domestic tragedy of the most affecting interest, which had been long known to a few friends, but was not till then discovered to the public. On the 20th of June, 1844, he was created a Doctor of Civil Law by the University of Oxford. In 1845 he published "Lectures of Three Continental Tours in the Festivals of 1841, 1842, and 1843," 2 vols. 8vo, and in 1854, a "Supplement to the Vacation Rambles, consisting of Recollections of a Tour through France to Italy, and Homeward by Switzerland, in the Vacation of 1846," 4to, 8vo.

The journeys were all rapidly made, and the information which the volumes contain is very scanty. Some of his speeches as an advocate and also as a member of parliament were published in a separate form. He was an eloquent speaker, and had extraordinary command of language, but his style was too florid and studied. The translation is that of a sound lawyer for dicing cases, at the same time that his persevering labour, great practice, and love of justice, made him respected both as an advocate and a judge. In his private character he was amiable and social in an eminent degree, and he had a large circle of friends, chiefly literary and legal.

The death of Mr. Justice Tarlton occurred on the 15th of March, 1846. He had opened the assizes at Stafford on Saturday the 11th, and, by an early morning, while delivering his charge to the grand jury, and commenting on the increase of crime and its causes, he was observed to be much excited. Suddenly his face became flushed, his head bent forward, and his body swayed on one side. The most immediate symptom was thrown into the judge's chambers, where it was found that he had ceased to live. He was buried in the cemetery at Norwood, near London. He left issue three sons and two daughters. In 1856 the members of the Oxford Circuit placed a bust of him, sculptured by Longh, in the Crown Court at Stafford. It is an excellent likeness.

TALLOW, for TALLAGH. [WATERFORD.] TANACETINE. [CHEMISTRY, S. 2.] TAYLOR, J., &c. [ANATOMY.] TAPE-WORMS. [ENTOZOON; PHYSIC, PRACTICE OF (Worms). S. 2.] TAPITELÉ. [ARABE, etc., S. 2.] TARNAX-BULLE. [CHEMISTRY, S. 2.] TARDANUS. [BENZYL.] [DEER.] TARRAGON. [ARTEMISIA.] TARTARIC ACID. [CHEMISTRY, S. 2.] TARVÉE, JOHN CHARLES, was born of English parents at Dieppe, March 27th, 1790. At the breaking out of the war in 1793, his family, in common with all other English residents at Dieppe, were thrown into prison. At that time the little boy was staying at the country-house of a friend of his mother (M. F. Tarvit, de la Comarque, in the Cape de los Pinos et de Tarragona ou du Département de la Seine Infrérieure), and when his family, through the interest of friends, had the means of escape given them, he was left behind in France until an opportunity should offer to send him to England. This never occurred. But M. F. Tarvit, faithful to his trust, brought the child up as his own son, educated him partly himself and partly at the government school at Pont-Andemer, and at the age of fifteen took him into his own employment in the leather manufacture under the government. In the year 1808 M. F. Tarvit got the youth an appointment in the Administration de la Marine, in which service he remained, first as secretary to the admiral of the fleet at Toulon, then as secretary to the admiral at Brest, afterwards at Genoa, and Brest, till at the cessation of the war in 1814 he was enabled to renew his intercourse with his family. In March 1815 he obtained a short leave of absence, and hastened to England, where he found his mother, brother, and sister living. He returned to Paris at the expiration of his leave in April, where he found that Bonaparte had escaped from Elba, and had put himself at the head of his army, and that the king, Louis XVIII., had fled. Such being the uncertain state of affairs, and his own desire to return to England, he left his situation, and in less than a week rejoined his mother. He soon sought and obtained employment as a French master; first at the grammar-school at Maastricht in Austria, where he was sent at the age of 16, and then at the school to live at Windsor, and in 1829 he was appointed French master to Eton school, where he remained, and which situation he held till his death, April 10th, 1851, aged sixty-one.

Besides having written several elementary works, now used at Eton and other public schools, he published, while at Maastricht a Dictionary of French and English. Verbs, showing their Government and Peculiarities. During his residence at Windsor he wrote his translation of the "Inferno" of Dante in French verse, with a volume of notes; and subsequently Lectures on French History, Paris, Ancient and Modern, and some minor works. He also revised the grammars of Uanostrochter and Lizerio, and Nugent's Pocket French and English Dictionary. For the last ten years of his life he was engaged on his "Phrasological French and English Dictionary," an original work of immense labour, and which has given to its author a high place amongst those who have most distinguished themselves in philological pursuits.

TASMANIA. A full description of this colony, formerly more generally known as Van Diemen's Land, will be found in vol. xxiv. The following gives the material alterations that have taken place.

The population of Tasmania in 1847 had increased to 70,164, of whom 47,828 were males and 22,336 females. Of this total 33,173 were either free emigrants, or were born in the colony; the rest were then or had been convicts. Emigration to Victoria colony has combined with other causes to produce very material alterations in the population of Tasmania. On Dec. 31, 1865, it was only 69,962, of whom 7740 were convicts, although 10,887 emigrants had arrived during the year. The greater part merely made it the place of transit, but many of the old settlers must also have left.

Notwithstanding this drawback the colony is highly prosperous, and its trade and commerce have been continually expanding. The efforts of the local government are rapidly extending improvements on the island. Among the greatest works is a bridge over the Derwent, on the high road from Hobart Town to Launceston; it is of wood, and has 20 bays, or arches, of 32 feet span each.

The exports to Great Britain in 1853 included 6,514,751lbs. of wool (the average quantity for four years, 1849-52, had been upwards of 5,000,000lbs.); 9099 hides (the average number for the previous four years had been about 3000); 778 cwt. of tallow, 9,500 cwt. of spermaceti, and 405 tons spermaceti oil. The declared value of the imports of British produce and manufactures from Great Britain in 1853 was 1,405,927l., the average for the preceding four years being only about 420,000l. Of foreign and colonial produce, chiefly spirits, wines, and tobacco, imported from Great Britain, the declared value for 1853 was 694,790l. The number of sailing vessels entered as belonging to Van Diemen's Land on December 31st, 1864, was, Hobart Town, 1,473; Launceston, 479. Of Steam-vessels, 6, of 510 tons aggregate burden, were entered at Hobart Town, and 2 of 356 tons at Launceston. In 1854 the value of the imports was 2,604,680l., of which 1,776,694l. was from Great Britain; the exports amounted to 1,43,051l., consisting chiefly of wool, oil, timber, cattle, flour, and grain. The extent of land under cultivation was 127,732 acres, of which 49,920 were of wheat, and 33,320 of oats; while the sheep numbered 1,631,308, the horses 37,974, the horned cattle 17,900, and the swine 22,998. The land revenue had amounted to 112,226l.

Hobart Town, the capital of the colony, is built upon an undulating surface, on the left bank of the river Derwent. The streets are of good width, and laid out on a regular plan, and intersected with good bridges. Some improvements have been made of late years, particularly in the construction of a new market-place in the town, and of docks and wharves at the river-side. Several of the public buildings are handsome. A small rivulet which runs through the town, affords a supply of fresh-water.
population on December 31st, 1847, was 21,467, of whom 35 wereaborigines.

Locarno, the second town of the colony, is situated at the confluence of the North Esk and South Esk, which there form the Tamar, 40 miles from its outfall in Bass's Strait. It is 125 miles N. by W. from Hobart Town. Launceston contains a government house, an court house, jail, barracks, and other public buildings, and several places of worship.

Convenient wharves have been constructed. The population in 1847 was 10,100. The shipping trade is important. A good highway extends from Hobart Town to Launceston; there are inns along it at short distances from each other.

Richmond is situated on the Coal River, about 12 miles N.E. from Hobart Town, and contains a population of 8300. Longford has a population of 6000. Arcoxia is a small town in the county of Launceston, with a population of 838.

Tasmania is divided into 19 police districts, and each of the districts generally contains a town or village of the same name. Lincoln, Perth, and George Town at Port Dalrymple, are places of some importance. They are seated on the Tamar, or the Macquarie, as it is called, in the upper part of its course.

Government. — Tasmania is administered, under the 13 & 14 Vict., cap. 59, by a Lieutenant-Governor, who is appointed by the Governor of the Governor-General of New South Wales, of whom two-thirds are elected and one-third nominated. The judicature consists of a supreme court, courts of quarter sessions, and courts of requests.

A bishop of Tasmania was appointed in 1842, whose duties are divided among a clergy and dependents, and is divided into the archdeaconry of Hobart Town, containing 34 places of worship, and the rural deanery of Longford, containing 19 places of worship. There are also 13 places of worship in the Church of Scotland, 14 Congregational, 21 for Wesleyan Methodists, 15 for Independents, 3 for Baptists, and 2 for Jews. Of these bodies all except the Independents and Jews receive government aid.

There are numerous private schools in Hobart Town and Launceston, which are supported by subscription.

TAYLOR, GENERAL ZACHARY, late President of the United States of North America, was born Sept. 24, 1784, in Orange County, Virginia. He was the third son of Col. Richard Taylor, who had distinguished himself in the war of the Revolution, and who in 1789 removed with his family to Kentucky, where the settlers were then very few. Col. Taylor obtained from President Jefferson, May 3, 1806, a commission for his son Zachary as first-lieutenant in the United States Army. In 1810 Zachary Taylor married. On the breaking out of the war in 1812, having then become Captain Taylor, he was placed in command of Fort Harrison, a stockade on the river Wabash, for his defence of which against the attacks of the British he was subsequently rewarded with a knighthood.

He distinguished himself on several other occasions during the war, but when it terminated he was reduced from his brevet rank of major to his previous rank of captain, a step backward which he refused to consent to, and resigned his commission. He was, however, in the course of the year reinstated in his rank of major by President Madison. In 1816 he was placed in command of the post at Green Bay, on Lake Michigan, and on the 20th of April, 1819, received his commission as lieutenant-colonel. In 1832 he received his commission as colonel from President Jackson, and in that year served under General Scott in the Black Hawk war.

He subsequently held the command of Fort Crawford at Prairie du Chien, where he remained till 1836, when the Seminole war in Florida called for his services. The manner in which he there performed his harassing duties acquired for him great reputation among his countrymen, and the battle of Okeechobee, fought Dec. 29, 1837, gained him the rank of brevet major by brevet. In 1838 he was appointed to the command of all the troops in Florida, where he remained till 1840, when he commanded the south-western division of the army was assigned to him.

In 1844, on the annexation of Texas, General Taylor was ordered to Florida as a suitable measure for defending that country against a threatened invasion from Mexico, and in August he concentrated his troops at Corpus Christi. There he remained till March 11, 1845, when he broke up his camp and moved westward with a small army of occupation of about 4000 regular troops. He reached the Rio Colorado on the 20th of March, crossed it without opposition, and on the 29th of March arrived at the Rio Grande and encamped near Resaca de la Palma. On the 21st, 22nd, and 23rd of September, he attacked and captured the city of Monterrey, which was strongly fortified, and defended by a superior force. In February he gained the victory of Buena Vista, in which the Mexican army of 20,000 men under General Santa Anna, was defeated with very great loss by the American army of about 6000 men.

This victory led to negotiations for peace, and the treaty of Guadalupe-Hidalgo was signed on the 2th of February, 1848. In May, 1849, he returned to his residence at Benton Ronge, in Louisiana, where he had purchased an estate, and on the 1st of June, 1845, the Whig Convention in Philadelphia put him in nomination for the presidency. On the 23rd of June, 1850, Mr. Taylor was elected President of the United States of America, and on the 4th of March, 1849, he was inaugurated, and entered upon his term of office. He died July 9, 1850, at Washington, and was forthwith succeeded as President by Millard Fillmore, the Vice-President. He left a widow, one son, and two daughters.

TCHAD, LAKE. [AFRICA, S. E.]

TCHADDA. [QUOBA; AFRICA, S. E.]

TETHIN. [DEPOSITION.]

The name Tethin, or Tethin, is universally acknowledged by the Swedes as the greatest poet of Sweden, was born on the 13th of November, 1782, at Kykerud in Wermland. His father, also named Esaias, the son of a peasant, Lars Essalon, of Tegnaby, in the diocese of Vaxo, had a turn of genius. He became a student in the University of Uppsala. He took orders, and was the first of the family to assume the dignity of a surname. He took that of Tegnér, from his birthplace of Tegnaby, a village which is part of the township. On the Schoo of the University of Uppsala, as an appointed pastor, and which it may be noticed in is a remarkably ugly part of the country. It is in particular destitute of trees. "King Olof, the tree-farer, a man well known in Swedish history, took his pleasure there; his sons were all good men. The trees have not grown again for a thousand years." In February, 1792, when Esaias was in his tenth year, his father died, leaving a widow and six children, four sons and two daughters, in whose education he was a procusus. The four sons were all remarkable in their way. Lars Gustaf, the eldest, was of a mild and earnest character, strongly tinged with mysticism; Elof, the second, was full of wit and sentiment; the third, Johannes, was very apt in languages, and was married; and it is said that when he was desired to attend to what was going on in church, he could on his return repeat every word he had heard in it, without being able to draw any distinction between the lessons, the banns of marriage, and the sermon. Esaias, the youngest, was of a remarkable flexible character, and at different times of his life exhibited a striking resemblance to each of his brothers in their prominent characteristics.

At the time of his father's death, the two elder brothers, who were intended for the church, were already students at Lund; the expenses of their education quite absorved the resources of the family when deprived of a head, and the widow was grateful to a friend of her husband, Jakob Transtam, a Kronovich, or some other tax-collector, from taking the youngest off her hands, and make use of him to assist him in his business. Esaias soon made himself a most useful assistant, and was to the end of his life remarkable for his quickness with figures. He found among the numerous Scandinavian sagas of the 17th century, containing a number of Icelands sagas, with, in the same page, the Swedish translation: and almost his first attempt at composition seems to have been in a poem on the Saga of Njord, in the which he ascribes his name. The poem of "Fritiof," the great achievement of his early years, was founded on another. His only recorded attempt at poetry previous to 'Atle' seems to have been when a child at Millevik, an epitaph on a goose, a worthy com-
and aptitude for learning, was smitten with the thought that he was degrading himself out of his proper sphere; and one starry night, when, as he was driving home with him from a tax-collecting expedition, he turned the conversation on the heavenly bodies, and the boy, then aged thirteen, who had just been reading Batholomew's 'Philosophy for the Unlearned,' discoursed with fluency of things which Branting had never heard of, this feeling became too strong to be kept under. Lars Gustaf, the elder brother, was then aged eighteen years, and had become an officer with nine children. Branting wrote off to the captain in March, 1798, to say that he felt it a sin to keep such a boy as Essias from study, and to propose that he should be admitted to share, with the captain's boys, the instruction which the Ldwenhjelm family had long consoled and, the whole course of the young poet's life was changed. "I now began," he says in an autobiographical notice, written in after-life, "to study Latin; the method adopted was the old and sound, and, in my opinion, the only right one, which may indeed seem tedious and tiresome, but in the end, by the greater certainty it gives, spare time instead of wasting it." He stated that he began French and English at the same time—French in Tegn6r, and English in Mr. Jefferys's Grammar, which he received from a lawyer. He began to learn Greek, and received lessons from the archdeacon of Malma, the residence of Captain Löwenhjelm, who bore the marks of the iron rod with which Tegnér used to threaten it, when enthusiastically shouting out in English one of his favorite passages, "the living tree is not known!"

In the next year the services of Lars were transferred to the family of Christopher Myrman, an iron-master at Rämen, near Filipstad, who made some of the best iron in Sweden, and was a man of learning as well as a man of business. "It was a school of eloquence this brother should accompany him, and they both soon became almost members of the family. Myrman had eight sons and four daughters: Lars was tutor of the four eldest sons; Essias became at the age of fifteen tutor of three of the children, and became the fourth of the family, whom he married some years later.

At Rämen they found an excellent library in the classical languages, and a good collection of Swedish, French, and English books, but not a single German book; it was at the period before the introduction of German literature into Sweden. Of Shakspere, however, there was only "Hamlet," ' which, strange to say," remarks Tegnér, "interested me very little. It requires, however, a riper age than mine to be thoroughly understood."

According to his own recollections afterwards, he in seven months after commencing the study of Greek, had read the 'Iliad' three times through and through, and "twice, besides going through Virgil, Horace, and Ovid in Latin. 'It seemed to those around him,' says Böttiger, in his biography, 'as if he had been born with the foreign languages in his brain, and it only needed a gentle shake to wake the slumberers into life." He made himself at the same time proficient in chess and skittles. Often when the girl came to light his fire in the morning she found him still with his clothes on continuing the studies he had pursued all night. In 1799, when he went with his three pupils to the University of Lund, he passed such an examination in Greek that he received the степени of the first degree. His want of means became important when at this time so pressing; though he was supported by contributions from Branting and Myrman, that he resolved to relinquish a learned career, but a life of adventure which he hoped in classical Latin, led Fortunat Nordberg, a friend of his and an apparently to assist him to continue the struggle. For some time he studied eighteen or twenty hours a day; he made proficiency in mathematics, as well as in other studies, by means of a private school of his own. "Mr. Böttiger," says his biographer, "had a firm respect for learning, he became remarkable for the awkwardness, reserve, and rusticity of his manners. A post as under librarian, and afterwards that of assistant-treasurer of the Stock Exchange, increased his income, and finally, in 1806, he was awarded the Royal Swedish Academy of Sciences' prize. his country, and in the cultivation of poetry, which he had commenced some time before, but which he prosecuted during this time with such success that he was finally hailed by common consent the first poet of Sweden living or dead. He first obtained any attention, was on a melancholy occasion—the loss of his brother Lars Gustaf, who died in 1802. His elegy on that event was inserted in the 'Transactions' of the Literary Society of Gotenburg, of which he received some sort of prize. It was in 1808 however when there was an alarm of invasion that he suddenly burst forth as a poet of the first order, by his 'War-Song of the Scandanavian Defenders,' or 'Local Militia.' 'This warlike dithyramb,' says Böttiger, against the old school of classicism and elegance, 'seems to have once so grand and beautiful had never before been heard from the Swedish lyre. The electric lines ran like wild fire through the kingdom, bearing testimony that the North now owned a Tyrant fully equal to him who sang against the Roman Sparta.'

Tegnér, who had won the prize of the Swedish Academy; it was a spirited outburst of indignation at the degeneracy of the modern Swedes, compared with their ancestors, whose sword he weighed so heavily in the balance of Europe. Tegnér, who visited Stockholm to receive the prize, became acquainted with a great part of its literary men, at a time of transition when the Phosphorists, headed by Palmblad (Palmblad, S. 2), the introducers of German literature into their country, were contending with Tegnér for the head of the school of classicism and elegance, whose chief literary representative was Leopold. Tegnér, who was thought by his youth and his genius, naturally to belong to the anti-classical party, excited some surprise by undertaking the defence of Leopold, which he afterwards followed up by dedicating to him his poem of 'Axel.' His consecration as a priest in 1815 gave occasion to a poem on that subject, which was afterwards surpassed by a poem of the same kind, his 'Nattvaraldarene,' of children of the Lord's Supper, a sort of religious idyl, in 1820. In the same year, 1820, some santo of his 'Frichtofo Saga,' a romantic tale of ancient Scandinavia, appeared in the 'Ijama,' a periodical published by the Gothic Society, of which Geijer (Geiger, S. 2) was the leading spirit. 'Frichtofo Saga,' became so popular that it was successively translated into all Europe, and the whole country in either of them emerged into fame. His reputation was enhanced in 1821 by the publication of 'Axel,' a brief poetic romance, still thought to be one of the best of his poems. 'Axel' marked its culminating point in 1824, by the completion of 'Frichtofo Saga,' which became at once the most popular poem that has ever appeared in Sweden. From the period of the publication of 'Axel,' if not before, the name of Tegnör was recognized as that of the undisputed head of Swedish poetry.

This period of Tegnér's life was brought to a close by an unexpected, and at least at the outset, an unwelcome event. In 1824 he received the intelligence that the clergy of the diocese of Wexio had presented his name to the king as that of a fit man to succeed the esteemed Bishop G. B. I., and that the king had been pleased to select him for that office. As a clergyman he had not been remarkable for gravity of demeanour, and the general impression was that an excellent Greek to be accredited to a body, would now be turned into a very indifferent bishop. These expectations were disappointed. From the time of his appointment Tegnér's life took a different course. He ceased to appear as a poet, and gave himself up to the study of ecclesiastical business, the study of theology, and the accumulation of its revenues, in which his early experience with Branting was said to be of use. Almost the only unepisodic episode we hear of for some years is that memorable day in 1829 when he presented the poetical crown to Ochsen- neus, the Auti of Schillier ('Gottlieb Geikie, S. 1'); and when, at the same time, he was active in the Swedish academy's promotion of the study of the vernacular, and in the cultivation of national poetry. He was not at this time devoted to the Church; and in his study "wallaced with fathers of the church and biblical commentators." Thirty-one new churches were built in his diocese during..."
his episcopate. At the dioces which he attended he was distinguished for his conservative principles and his opposition to what he called "Radicalism," at the time when his younger contemporaries were so ardently tending in the same way, suddenly broke with the conservative party, on account of its propensity to carry reaction too far. His old liveliness was still to be found in his private letters. In the Diet of 1834 financial affairs were the chief subject; he opposed the policy of his leader, and his behavior was unwell, he said, that he was as little able to comprehend financial affairs as a member of the Bank committee. "As for bilinguism," he added, "it is unnecessary to carry that with one to the Diet. When I go there, and it belongs to the order of the day," Tegnér was still looked upon with such favor by his order, that in 1839 he was one of the three candidates proposed for the archbishopric of Upsal. Next year, alas! he was the inmate of a lunatic asylum, and are of much the same character as written shortly before in a letter to one of his friends: "there runs a vein of madness in my family. With me it has hitherto broken out in poetry, which is a milder kind of madness, but who can give me the assurance, that it will always take that way?" A selection of some months in an institution for the insane at Schleswig enabled him to return in 1841 to his family, and partially to his duties, and he was even able to preach so lately as June, 1845, but as a sick man, supported by his wife. He returned to his house and his house. He lay on the sofa, in cheerful spirits, and passed his time in reading. "About him," says Bottiger, "was generally seen a pile of books of different sorts and sizes, from the old Greek folio to the last fashions of printing of the French and English, and Voltaire and Scott were never wanting." After a stroke of paralysis and still weakened health, he died without pain on the 2nd of November 1846, shortly before midnight and during a beautiful appearance of the northern lights. His wife survived him, and he left six children, one of whom, a daughter, is married to Professor Bottiger of Upsal. Bottiger is himself a poet, and one of his best-known pieces is a description of a little incident which occurred to the writer of this notice, when he was present with his witness during the emotions which a stranger evinced over a book he was reading, and afterwards finding the book lying where the stranger had left it, he took it up and found it was "Frithiof's Saga." Tegnér, as we have seen, had lost his father in 1795; his mother survived till 1836, when she died at the age of ninety. In 1822, when the king of Sweden, Bernadotte, was returning from a visit to Norway, he heard that Tegnér's mother lived in a village he was passing through, and he caused her to be summoned and told her she had given birth to a son of whom she and Sweden might be proud. The mother of such a son however had passed most of her life in anxious tending on another son. Seven years, and at least in an unguarded moment walked into a river and was drowned.

The works of Tegnér were collected and published in six volumes by his son-in-law Professor Bottiger (Stockholm, 1847-48). Nearly three of the volumes are occupied by his smaller poems, two by prose works, chiefly speeches, and extracts from letters, and a volume and a half by the larger poems, on which the reputation of Tegnér is chiefly founded, and by a biography of the poet, from which we have taken most of our details. The smaller poems are many of them occasional verses on subjects of slight importance, but some are vigorous and interesting. One of his earliest is on "Pitt and Nelson," both of whom are objects of strong condemnation, Nelson being called the "Tamerlane of the Sea;" another, remarkably well written, is a dialogue between England and France, vituperating each other, in which England has decidedly the worst of the fray. The sympathies of Tegnér seem to have been everywhere limited, his contempt for Germans and Germany is repeated, and it is interesting to find it in his writings praise of any country but his own, which, except on a tour for health to Carlsbad in 1833, was the only one he had ever seen, or apparently ever wished to see. Child of the old Swed, he even at the age of threescore and ten, in a speech delivered in England and America at mechaniches institutes, &c., and bearing on the same class of subjects—the benefits of education, the utility of particular studies, &c. Of the larger poems, "Frithiof," "Axl," and the "Christ of the North," there is undoubtedly an opportunity of forming almost as good a judgment as the Swedish. No foreign poet has been so fortunate as Tegnér in his English translators. Of "Frithiof" there are at least five versions, more in number than we have been able to name. Of several of them, all are good. The first, by the Rev. William Strong, published in 1833, is undoubtedly the best, but is still the work of a man of learning, and of an enthusiast for his original; an anonymous one, published in 1842, is, next to the Strong's, of 1833, it is apparently in part by Frye, who deserves more notice than he has met with; a third, by R. G. Latham, in 1836, though not equal to Latham's "Axl," is a fair representation of the original; a fourth, by G. Stephens, now Professor of English at the University of Oxford, was published at Stockholm in 1841, and accompanied by a letter from Tegnér to say that he thought it the best English translation of himself he had seen; a fifth, by Oscar Baker, in 1841, possesses considerable merit. It is possible that the English reader, on the perusal of some of these, may arrive at the opinion that the "Frithiof Saga" has been considerably overrated. The same conviction has been arrived at by several English readers, among others the writer of this article, on the perusal of the original. The poem of "Frithiof" has no deep paths, no vivid eloquence. Its general character is that of neatness and prettiness rather than anything superior. It sinks often into tameness, and never rises to sublimity. The story, which follows too closely the original saga, is the story of a young northern warrior who is enamoured of the sister of the two young kings, who is denied her hand by her brothers, who, in his indignant proceedings thereupon, accidentally burns the sacred grove of children and is carried off by a god to a warlike expedition, on his return finds his beloved married to an old king, who generously puts an end to his existence when he discovers he is in the lovers' way, and finally obtains the hand of the lady after having humbly expiated the sacrilege and the atrocity which he committed. This story is told in four-and-twenty cantos, of which some are as short as ballads, and each one is in a different measure, one in blank verse, another in hexameters, &c. That an epic poem would be improved by a variety of metre, was a proposition laid down long ago by Dr. Watts, if not before him; but this mechanical variety of four-and-twenty different metres, not one repeated, has somewhat of a childish appearance. Tegnér's poem of "Axl" is in what may be called the Byronic metre, and in tone and structure strongly reminds the reader of Byron's " Mazeppa," or which it was doubtless modelled. The story is slight and commonplace—a maiden who falls in love to the war child of the Lord of Lidenbrock, who, being in love distracted—but the spirit with which it is told atones for every deficiency. Those who are fond of "Mazeppa" are sure to like this poem, either in the original, or its excellent English translation by R. G. Latham. There are two others, one by Oscar Baker, who has also translated "Tegnér" and another in "Blackwood's Magazine." The "Children of the Lord's Snapper" has been admirably translated by Professor Longfellow, who has also rendered various passages from "Frithiof" and "Axl."

TEG.B. a family of Savann Reptiles. [SAURIANS.]

The following is a synopsis of the genera:

1. Throat with two cross-folds, with larger 6-sided scales between.

A. Ventral shields small, long, smooth. Tongue contractile.

1. Teius.—Toes 5-5. Femoral pores distinct. Two species.

2. Callopistes.—Femoral pores none. Toes 5-5. One species.

B. Ventral shields broad, smooth.

* Tongue elongated, sheathed at the base. Teeth compressed.

3. America.—Toes 5-5. Teeth 3-lobed. Six species.

** Tongue not sheathed, free at the base.

Dicrodon.—Teeth compressed transversely, bld.  
Toes 3-5. One species.

Acrantus.—Teeth compressed transversely, bld.  
Toes 3-4. One species.

II. Throat with a collar of large shields.


7. Acanthophaga.—Scales of back large, of sides granular.


10. Crocodilurus.—Scales of back equal, similar. One species.


This family is well-illustrated by the *Teius Teguixus* of the British Museum Catalogue. It is the *Lacerta Teguixus*, Linn.; it embraces the order of *Tortoises*, Dumeril and Bibron state that they ordinarily inhabit the fields and the borders of woods, although they never climb trees; but they also appear to frequent sandy, and consequently arid tracts, where they are said to excavate burrows, in which they lay themselves up for the winter. When, in their flight to avoid pursuit, they come upon a lake, pond, or river, they plunge in, according to D'Azara, to escape from the danger which menaces them, and do not leave the water till all fear of danger is past. These Lizards, observe Messrs. Dumeril and Bibron, have not, indeed, webbed feet; but their long and slightly compressed tail becomes, without doubt, under such circumstances, a sort of oar, of which they well avail themselves. D'Azara states that they feed on fruits and insects, and that they also eat serpents, toads, young chicks, and eggs. He also relates that they are fond of honey; and that in order to procure it without fear of the bees, they come forward to the hive with their tails, they give the hive a blow with their tail, till repeated attacks they weary out the industrious insects, and drive them from their home. For figure of the *Variegated Lizard*, see *Lacerta*.  

TENANT.—THE UNWILLING LANDLORD. The provisions of the statutes 4 Geo. II., c. 28, and 11 Geo. II., c. 19, and 57 Geo. III., c. 53, have been superseded by those of the Common Law Procedure Act, 1852; the landlord's remedy remains, however, the same, the procedure alone is altered. [*Exempt. S. 2.*] Besides the remedy given to landlords in certain cases by the statute 1 & 2 Vict., c. 74, another equally summary method of recovering possession of premises when they are held over by a tenant, is afforded by the action of ejectment in the County Court. This tribunal may be applied to whenever the rent or value of the premises does not exceed 60L, and no fine has been paid. [*County Courts, S. 2.*]

TENNANT, WILLIAM, was born in 1786 at the little fishing-town of Easter Anstruther, in the County of Fife, Scotland, and was educated in the town-school, where he had for a fellow-student the afterwards celebrated Dr. Chalmers. In 1799 he was sent to the University of St. Andrews, and in 1801 was a fellow of and aide for the classical languages from the instruction and lectures of Dr. Hill and Dr. Hunter, but circumstances prevented his continuance for more than two sessions. At an early period of life he had lost the use of his feet, and could only move by the aid of two crutches. He was thus precluded from most active employments, and in 1801 he became clerk to his brother, who carried on the business of a corn- 

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THE ELEPHANTPEA, *Triumfetta pulcherrima*.—This is a tall, showy, climbing plant, rising from the dry sandy soils of the Sudan, and is remarkable for its long, pale, slender stem; the flowers are large, white, and fragrant; the leaves are palmately compound, and the pods contain many seeds. It is cultivated in many parts of the tropics, and is said to be of great value as a food for cattle. It is also useful as a shade tree, and is often planted along roadsides and in parks. Its flowers are large, showy, and fragrant, and the seeds are edible. The plant is propagated by seeds and cuttings. It is a hardy perennial, and can withstand severe weather. It is also known as *Triumfetta pulcherrima*. It is a large, showy, climbing plant that is native to the Sudan, but is now widely cultivated in many parts of the world. It has long, slender stems that can grow up to 20 feet tall. The flowers are large, white, and fragrant, and the leaves are palmately compound. The pods contain many seeds that are edible. The plant is propagated by seeds and cuttings and is hardy and can withstand severe weather. It is also known as *Triumfetta pulcherrima*. It is a large, showy, climbing plant that is native to the Sudan, but is now widely cultivated in many parts of the world. It has long, slender stems that can grow up to 20 feet tall. The flowers are large, white, and fragrant, and the leaves are palmately compound. The pods contain many seeds that are edible. The plant is propagated by seeds and cuttings and is hardy and can withstand severe weather. It is also known as *Triumfetta pulcherrima*. It is a large, showy, climbing plant that is native to the Sudan, but is now widely cultivated in many parts of the world. It has long, slender stems that can grow up to 20 feet tall. The flowers are large, white, and fragrant, and the leaves are palmately compound. The pods contain many seeds that are edible. The plant is propagated by seeds and cuttings and is hardy and can withstand severe weather. It is also known as *Triumfetta pulcherrima*. It is a large, showy, climbing plant that is native to the Sudan, but is now widely cultivated in many parts of the world. It has long, slender stems that can grow up to 20 feet tall. The flowers are large, white, and fragrant, and the leaves are palmately compound. The pods contain many seeds that are edible. The plant is propagated by seeds and cuttings and is hardy and can withstand severe weather. It is also known as *Triumfetta pulcherrima*. It is a large, showy, climbing plant that is native to the Sudan, but is now widely cultivated in many parts of the world. It has long, slender stems that can grow up to 20 feet tall. The flowers are large, white, and fragrant, and the leaves are palmately compound. The pods contain many seeds that are edible. The plant is propagated by seeds and cuttings and is hardy and can withstand severe weather. It is also known as *Triumfetta pulcherrima*. It is a large, showy, climbing plant that is native to the Sudan, but is now widely cultivated in many parts of the world. It has long, slender stems that can grow up to 20 feet tall. The flowers are large, white, and fragrant, and the leaves are palmately compound. The pods contain many seeds that are edible. The plant is propagated by seeds and cuttings and is hardy and can withstand severe weather. It is also known as *Triumfetta pulcherrima*. It is a large, showy, climbing plant that is native to the Sudan, but is now widely cultivated in many parts of the world. It has long, slender stems that can grow up to 20 feet tall. The flowers are large, white, and fragrant, and the leaves are palmately compound. The pods contain many seeds that are edible. The plant is propagated by seeds and cuttings and is hardy and can withstand severe weather. It is also known as *Triumfetta pulcherrima*. It is a large, showy, climbing plant that is native to the Sudan, but is now widely cultivated in many parts of the world. It has long, slender stems that can grow up to 20 feet tall. The flowers are large, white, and fragrant, and the leaves are pal
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of Arkansas; N. by the Indian Territory, W. by the Territory of New Mexico, S. S. W. by the Republic of Mexico; and N. by the Gulf of Mexico. Its greatest length from north to south is 700 miles; its greatest width from east to west, 800 miles. The area is 274,356 square miles. The population in 1850 was 212,592 (of whom 58,161 were slaves), or 0.96 to the square mile. This however does not include the Indians, chiefly occupying the hill country, who were in 1853 estimated by the Commissioner of Indian Affairs at 29,000. The federal representatives according to the Census of 1850 was 192,297, in which number three-fifths of the male population were included. According to the present ratio of representation, entitles the state to send two representatives to Congress, To the Senate, like each of the other United States, Texas sends two members.

Surfaces: Hydrography, &c. — The surface of so vast a country is as varied as are all the malariously described as comprising a low and level region, an undulating or prairie tract, and a hilly or mountainous district, answering generally to what have been called Southern and Eastern, Middle, and Western Texas.

The level region occupies the entire coast, and reaches 80 or 60 miles into the interior. For 10 or 12 miles inland the country is subject to inundation, but behind this swampy tract it rises imperceptibly for some miles, and then stretches away in a plain with a more or less undulating surface. This plain is from 10 to 30 feet above the water-courses, and with the exception of the low bottoms along the banks of the rivers, it is not subject to inundation. The tide, though it varies only from two to three feet, ascends the river by a distance of 45 to 60 feet, but the mean level of the sea is a straight line. The whole of the plain is wooded, with the exception of the highest tracts of land between the rivers, which are destitute of trees, and exhibit fine prairies. The forests consist of different kinds of oak, hickery, iron-wood, sugar-maple, and other useful trees, which are found in the southern states of the American Union. The whole of this tract is in process of conversion into an immense field, producing cotton, maize, wheat, tobacco, and every kind of plant which blossoms and thrives in the borders of the tropics; the sugar-cane flourishes here, but is not much cultivated.

The undulating country at the back of this plain, though naturally less fertile, has a more genial and healthy climate, and with moderate culture appears capable of producing almost unlimited supplies of corn, cotton, and tobacco, while the uplands afford vast and excellent grazing grounds, being covered with grass, which maintains its verdure throughout the year. This is the most productive and productive portion of the state. The country between the river-bottoms generally rises from them with a gentle declivity to an elevation of 200 to 400 feet, and presents for the most part an undulating surface, on which isolated hills of considerable elevation are distributed. The greater part of this tract is destitute of trees, which occur only in isolated clumps along the bases and declivities of the hills, and at considerable distances from one another.

Western Texas, the hilly and mountainous district, includes the southern portion of the Sierra Sagrancos, and a nearly parallel range on the east called the Guadalupe Mountains. This region is little known, being as yet left to the Indian tribes, chiefly Cumanchees, to the wild animals, and to the hunter. Many of the mountains have been said to rise more than 2000 feet above their bases. Most of the rivers of Texas have their origin in the mountain region, and American writers speculate freely on what may have been when the 'water-power' is fairly turned to account. Texas owes much of its great capability for agricultural purposes to its numerous rivers and the regularity of their course. Nearly all the rivers, even those which run only 20 miles, are navigable. The greatest part of these have been said to be inferior to the celebrated Georgian Sea Island cotton. Tobacco also thrives well, and is becoming an important product of the state. The sugar-cane florescences, but, as already noticed, engages very little attention from the Texas farmer. All the region is an abundant crops. Maize is the chief grain staple; two

The Red River, and which, flowing chiefly in a south-southwestern direction, approaches nearly the centre of Texas and the most fertile districts, and enters the sea after a course of more than 400 miles; and the Rio Trinidad, which, after a course of more than 300 miles in a south-south-easterly direction through a very fertile tract, falls into the Gulf of Mexico, where separate Texas from the Indian territory and Louisiana, are noticed under Louisiana. The Sabine has a length of 350 miles, and is navigable for 150 miles, and much higher, byfeed boats. Before reaching the gulf it expands into a lake 50 miles in circumference. The bar at its mouth has 4 feet of water over it at low tide.

There are several good harbours along the coast. The low coast is skirted by a number of long flat islands, separated from the main by narrow straits; but these are much exposed to the sea, and afford little shelter. The coast is sufficiently well adapted for vessels of moderate burden. The bar at the mouths of the rivers have tolerably deep water on them, and there is no part of the extensive Gulf of Mexico which has more or better harbours, bays, and inlets than those of Texas. There are no lakes of any importance in the state; and no canals have yet been constructed.

A southern Pacific railway is to cross Texas from east to west, and several other railways are projected, but none have been made. All the western roads are many of them well laid out, and in good condition.

Geology, Mineralogy, &c. — The geological features of Texas have been but cursorily examined. The mountains consist principally of tertiary and recent deposits. In the eastern portion of this district a considerable belt of Lower Silurian strata has been observed. North of this along the Saba River, carboniferous strata occur. Much of the centre and north of the state appears to belong to the cretaceous system of rocks; while the whole of the level region, and the low districts bordering the Gulf of Mexico consist of tertiary and recent deposits.

In minerals the state is believed to be very rich. Gold has been long known in the smaller streams of the western portion of the mountain district. Silver also occurs in the hill country, and the silver mine of Saba is said to have been one of the richest in America during the Spanish occupation. Iron ore appears to be very widely distributed, and is known to occur in the southern part of the state. Lead and copper have also been found in several places. Coal occurs on the Trinidad and Brazos rivers. Alum is obtained in two or three places. Salt occurs very extensively in salt springs and lagoons; large quantities being taken from the salt lake near the River Pothash and soda are also obtained in dry seasons near the salt lagoons. Asphaltum is obtained on the coast.

The climate of Texas varies according to the locality from tropical to temperate; yet, except along parts of the coast and the rivers where subject to inundations, the climate is said to be generally pleasant and salubrious—in some places eminently so. The summer heat is modified by refreshing breezes, which blow almost uniformly from the south. In the interior, except in the northern part of the state, Texas has a periodical winds: from March to November they are from the south, and little rain falls; the rest of the year mostly windless, and in December and January they are strong and keen.

The characteristics of the soil and productions have been noticed in speaking of the surface of the country. Cotton has now become the staple of Texas: it generally grows well and abundant. Tobacco is also found. The cotton is said to be inferior to the celebrated Georgian Sea Island cotton. Tobacco also thrives well, and is becoming an important product of the state. The sugar-cane florescences, but, as already noticed, engages very little attention from the Texas farmer. All the region is an abundant crops. Maize is the chief grain staple; two
The crops of fruit ripen well. The vine grows luxuriantly, and it appears probable that Texas will become a wine-growing country. The orange, lemon, fig, peach, nectarine, pine-apple, olive, paw-paw, plum, apple, gooseberry, and many other fruits of both southern and northern climates ripen in abundance. There are numerous garden vegetables of almost every kind thrive remarkably here. Among the indigenous plants are the yam-pa, or Texas teas-tree, the leaves of which yield an infusion which serves as an agreeable cheap substitute for tea; and the nopal, which is a favourite food of the chinchilla insect, while cattle and horses feed on its fruit and leaves, and its wood is used for making fences, and for fuel. The native wild flowers include many of the choicest varieties of the Alps and conservatory; among others are the dahlias, stellaris of every variety, geraniums, passion-flowers, trumpet flowers, perpetual roses, mimosa, and an endless variety more of the most brilliant hues.

The trees of live oak and cedar surpass those of any other state in the Union. The entire coast, the river bottoms, and the chief part of the eastern section of the state, are heavily timbered with pine, oak, sash, hickory, walnut, cedar, cypress, and other forest trees, often of noble size and substance; and forest islands occur all over the prairie country.

Horses and cattle form an important portion of the wealth of Texas, the rich prairies affording unlimited pasturage. Swine are abundant; and though the wild animals, once so numerous, are rapidly diminishing in numbers. Buffaloes however yet roam the wilds in herds of many thousands; as do also deer. Wolves and foxes are still numerous, and the black bear abounds among the same, and the antelope and the wild-buck are numerous in the woods. Mustangs are found in droves in the west and north; when domesticated, they are much prized for their fleetness. Moose-deer, antelopes, mountain-goats, racoons, opossums, rabbits, squirrels, and numerous smaller animals are also found. The wild-fowl, in almost interminable numbers and of the most various kinds, afford ample supplies of game to the sportsman; and there are numerous singing-birds, paroquets, mocking birds, wood duck, and the ordinary kinds, as cock, mullet, pike, &c., and of species not usually met with, as the red-fish (which gives its name to Red-Fish River, where it abounds), a fish of delicious flavour and large size, sometimes weighing 60 lbs., the gar-fish, and the alligator. The alligator is a large river reptile, which is said to measure several yards in length, and to resemble the alligator in shape, &c. The common alligator is met with of very large dimensions, in the lakes and the lower course of several rivers. Oysters, lobsters, crabs, and other shell-fish are taken all along the coast. Turtles abound in the bays and harbours.

Manufactures, Commerce, &c. — The manufacturing industry is chiefly that incidental to an agricultural state, the produce of the capital being invested in grain, and cotton, the staple and most valuable article of commerce. There are somewhat considerable iron-works, machine-shops, and carriage and harvest factories.

The direct foreign commerce, though steadily increasing, is not very great, most of the exports being made coastwise to New York, New Orleans, &c. The exports during the year ending June 30, 1833, amounted to 1,029,681 dollars, of which 948,918 dollars were of domestic produce. The imports during the same period amounted to 281,649 dollars, and consisted of 187,511 dollars in foreign vessels, and 125,915 dollars in foreign vessels. The total shipping owned in the state in 1830 was 3897 tons, of which 3509 tons belonged to the district of Galveston.

Austin City, the capital, is situated on the left bank of the Rio Colorado, in 30°. 28' N. lat., 97°. 45' W. long.; was popula- tion 623. It is merely a village, but it contains the state buildings, and supports two weekly newspapers.

Galveston, the port city, is the commercial capital of Galveston county, is situated near the east end of Galveston Island, about 200 miles S.E. from Austin; population, 4177. The harbour of Galveston is the best in Texas, and sixteenth of the best in the Union; it is large enough to accommodate six large vessels. The trade of Galveston is very considerable, and is steadily increasing. A regular line of communication by steam-ships is maintained with New Orleans. There are a few good public buildings in the city, and numerous warehouses, hotels, &c. Galveston Island is 10 miles by 1 mile, and about 2 miles wide. It was once a favourite lurking place for pirates, but is now thoroughly cultivated, and the residence of several wealthy farmers. During summer it is much resorted to by invalids.

Houston stands at the head of navigation on Buffalo bayou, 160 miles E.E.S. from Austin; population, 2396. Next to Galveston, Houston is the chief business town in the state, being the centre of a rich cotton district. There are several state buildings, churches, and schools. A wharf 500 feet long, with cotton press at each end, extends along the front of the city.

San Antonio, near the source of the river of the same name, 76 miles S. by S. from Austin, population 1848, is the chief town in the S.W. part of Texas, and on the ancient route to the Mississippi. North America. It contains several ecclesiastical edifices erected during the Spanish occupation, a large ruinous fortress, and other vestiges of its former possessors; also a United States arsenal and some modern structures.

History, Government, &c. — The state was formed a part of Mexico. For some years prior to that date the American colonists, an active, numerous, and united body, had been making every possible effort to prepare the way for a revolt of the Mexican colonies. In 1810, the hostileilities commenced in earnest. The Mexican government was unable to suppress the rising; and eventually the Mexican army, under General Santa Anna, the president of Mexico, was defeated at Jutiapa by the Texans, under the command of the American general Houston. Santa Anna was made prisoner, and, as a condition of his release, agreed to sign a treaty acknowledging the independence of Texas. The Mexican senate disavowed the authority of Santa Anna to make such a treaty, but no steps were taken towards enforcing a re-composition of Texas; and in 1842 the United States of North America formally admitted Texas into the Union as a sovereign state. This led at once to war between Mexico and the United States; but the former country was soon defeated, and in 1846 the conflict was ended by the treaty of Guadalupe-Hidalgo. The state is divided into 25 districts, each with a county-seat.

The constitution was adopted in August, 1845. By it the right of voting is vested in every free white male citizen who shall have resided in the state for one year. The legislature consists of a Senate of not less than 19 nor more than 33 (at present 21) members, who are elected for four years; and a House of Representatives, of not less than 40 nor more than 90 (at present 66) members, who are elected for two years. The state is divided into 25 districts, each with a county-seat. The revenue for the year ending October 1857, was $1,544,694 dollars, and the expenditure the same. The state militia is composed of about 18,500 men and 1248 commissioned officers. In 1850 there were in the state two colleges, having 7 teachers and 155 students, the public schools remaining 368 teachers and 7498 scholars.

(Cyathetters of the United States: Official Reports relating to Texas, &c.; Seventh Census of the United States: American Almanac; Marion, Humboldt, &c.)

THALARCTOS.

THALLOGENS, a class of Plants proposed by Lindley for those Flowerless Plants which are distinguished by the absence of an axial atom. It includes all the Cryptogamia, with the exception of Mars and Mosses.

THEIN, Common rail. 1.

THENARD, LOUIS-JACQUES, BARON, a distinguished French chemist, was born at Nogent-sur-Seine on the 4th of May, 1777. He went to Paris early in life, and became
a pupil of Vanquelin. He devoted himself with so much zeal and success to the study of chemistry that when he was only twenty years old he was appointed demonstrator of chemistry in the Polytechnic School of Paris. By his unusual industry and great knowledge of his subject he was at last made professor of chemistry in the College of France and in the University. In 1824 he received the title of Baron on the occasion of the coronation of Charles X. In 1833 he was made a member of the Academy, and in the same year received the first half of a prize of 20,000 francs for his studies on the stamens of the coquelicot. In 1837 he resigned his professorship of chemistry in the Polytechnic School, and in 1840 he gave up his chair in the University of Paris. Baron Thénard was one of the most successful of the greater chemical reformers of the 19th century. His separate works however are not numerous. One of the best known of his literary productions he published in conjunction with M. Gay Lussac; it is entitled 'Recherches physico-chimiques'. This work was published after the discovery of the metallic nature of soda and potash by Sir Humphry Davy. Numerous experiments on the subject of the action of the galvanic pile are recorded, and methods of obtaining potassium and sodium independent of galvanism are indicated. Other subjects of high scientific interest were discussed in this work, which served to give its authors the first position amongst experimental chemists. In 1813 M. Thénard commenced the publication of his 'Traité de Chimie élémentaire, théorique et pratique'. This work was a full introduction to the science of chemistry and has gone through several editions and been translated into German; the last edition was published in France in five volumes in 1838. The great contributions of Thénard to the science of chemistry are to be found in the scientific journals and transactions of science of his time. Of these there is a vast number, embracing the whole range of chemical science. There is indeed no branch of chemistry at which he did not labour, and there is no subject he has worked at which he has not left considerable light. He died in the month of June 1837, and was buried publicly in Paris on the 23rd of that month. For many years before his death Baron Thénard had withdrawn from the pursuits of chemical science. To the last however he took a deep interest in the development of the scientific institutions of France. He was an administrator of the College of France and of the Faculty of Sciences, and vice-president for many years of the Superior Council of Public Instruction; and he has contributed more largely than any other individual since the death of Cuvier to the development of the scientific institutions of France.

THERAPEUTICS. Under this head it is proposed to give an account alphabetically of some of the more important applications which have been introduced into the list of the 'Materia Medica' since the publication of the first Supplement to the 'Penny Cyclopaedia.'

Anamirta or Anamirta, the name of a genus of plants belonging to the order Rubiaceae, to which the plant yielding the Cocculus Indicus of commerce is now referred. It has the following characters: flowers dioecious, calyx of 6 sepals in a double series with 2-closed pressed bracteoles, corolla none; stamens on separate flowers united into a central column, dilated at the apex; anthers numerous, covering the whole globose apex of the column. The flowers with pistil are not known, but the fruit is a 1- to 3-celled drupe. The seed is globose, deeply excavated at the bulla, albumen flabby, oedylous very thin, diverging. The plant which yields the pericarp of Cocculus is the only species of this genus. It is a strong climbing shrub, and is met with on the coasts of Malabar and the Eastern Islands. It is called Anamirta Cocculus.

Anæsthetics, is the term applied to those agents, which, when being applied or administered to the human body produce either a local or general insensibility. Such agents act more especially on certain parts of the nervous system, depressing, if both of its power of communicating and perceiving, the sensation of the part upon which they are applied. The state of anaesthesia comes on in various forms of paralytic disease, and as such has been known and described by medical writers. Anaesthesia can also be produced by artificially producing states of paralysis of the nervous system brought on by what is called animal magnets. In this state of the system the anaesthesia is sometimes so perfect that surgical operations have been performed on persons whilst in it perfectly unconsciously. This was known previ-ously to the general introduction of anaesthetic agents during the performance of surgical operations generally. All narcotic medicines will produce conditions of anaesthesia, in which surgical operations may be performed without pain. During the action of alcohol on the nervous system it is capable of producing a condition of insensibility without the knowledge of the patient. Although these circumstances have been generally known, it was not till about the year 1847 that any attempt was made to introduce anaesthetic agents as means of rendering all surgical operations. About this time two gentlemen in America, Drs. Morton and Jackson, made experiments on human beings with the nitrous oxide (laughing gas), and found that a state of insensibility could be produced under which surgical operations might be performed. The effects of this gas in producing excitation of the nervous system had been made known by the experiments of Sir Humphry Davy, and its peculiar action was often exhibited in the lecture-room of the chemist. It was also known that sulphuric ether produced remarkable effects on the human system. The merit, however, of the application of these remedies to the production of insensibility during the performance of surgical operations is due to Drs. Morton and Jackson. Having discovered that ether was much preferable for this purpose to nitrous oxide, they made known the important fact, that under the influence of this agent an insensibility might be produced under which persons might undergo the most severe operations without injury to their health. This announcement was speedily made known, and in the course of a few months the facts were realised in all parts of the world. In London the action of this agent was first tested in surgery. The action of ether, and the best method of administering its vapour, was investigated by Dr. John Snow, who in September, 1849, published a work on the 'Inhalation of the Vapour of Ether.' After the successful experiments with ether it was found that other agents similarly constituted acted in the same way upon the human system. This subject was investigated with great success in Edinburgh, and led to the discovery by Dr. Simpson of that city, that chloroform has equal powers to ether, and is administered both as fumes and as liquid, more safely and efficaciously than even ether. From this time chloroform became more generally used, and is now the substance which is generally employed for the production of artificial anaesthesia. After this Dr. Snow showed that amylene was capable of producing the same effects as chloroform. Whilst Dr. Richardson has shown from experiments on living animals that the dust of the common puff-ball, Lycopodium giganteum, which had been used by Apuleius as a narcotic in ancient times, had also the property of producing insensibility. These agents appear to act entirely through the nervous system, and according to the time employed in their administration will be their effect on the nervous centres. The first effect is to paralyse the conscious faculties; it is the brain, and a kind of intoxication comes on in which the patient is excited, the intellectual powers are deraigned, and the person acts as though drunk. This effect is produced much more quickly by the vapours of the above mentioned substances than by drinking alcohol, it also passes off much more rapidly. It was to this action more especially that the effects of the nitrous oxide and ether were confined previous to the discovery of their anaesthetic properties. The next effect is that the spinal cord is paralysed, in, the effect extends from the brain to the cerebellum, and this organ loses the power of regulating the movements of the body. This effect on the body is also produced by the drinking of alcohol. As the vapour continues to act on the system, the next nervous centre affected is the spinal cord, and the functions of sensation and motion immediately under the control of this part of the nervous system, are more or less affected. It is in this stage that consciousness is lost, if however recovery of some of the above sensations is not entirely lost, and the individual is pronounced in a state of anaesthesia. In this condition animal life is held in abey-ance, and the body is insensitive to all external agents. There is still however, a sufficient amount of nervous energy left, for though the heart beats, the lungs perform their functions, and other actions essential to life are carried on. These functions are, however, under the influence of these anaesthetic agents, and should too large a dose of them be administered,
they cease, and death ensues. This is one of the accidents to which the employment of these remedies is exposed, and against which the greatest precaution should be employed.

Dr. Snow, who has practically studied the agency of these remedies more extensively than any other writer, divides the action of ether into five stages. "In the first degree the person experiences various changes of feeling, but still retains a correct consciousness of where he is, and with his actions and reactions in voluntary movements. In this stage the patient's feelings are generally agreeable, often highly so. In this stage it is not practicable to perform operations without a certain amount of pain. When, however, persons have experienced the effects of the inhalation of ether, they return to this stage, and are free from the pain of an operation, whilst their consciousness has sufficiently returned to enable them to know what is going on. In the second degree, the mental faculties may be exercised and voluntary actions performed, but in a disordered manner. In this stage persons are often seized with a tendency to laugh, sob, or scream. They throw themselves about, their actions are insinuate, and not under the direction of the patient. The act of breathing is performed, and many operations not carrying the action of the anesthetic further than this stage have regarded it as useless. The patient may return to this stage from a further one, but it is most desirable that operations should not be continued in it. In the third degree there is no evidence of any mental function being exercised, consequently no voluntary motions occur, but muscular contractions in addition to those concerned in respiration may occur. There is sometimes great rigidity of the muscles, and the patient is not a very agreeable object to attend to, but not to utter any articulate sounds. "If this degree is well established, and if the patient has been detained in it at the same point, by inhaling at intervals, or by inhaling dilute vapour, operation may usually be performed without producing any other effect than a distortion of the features expressive of pain, and perhaps a slight moaning and an increased frequency of respiration, and in some instances a general rigidity of the muscular system." There is never an accomolulation of operations in this degree, even when symptoms of pain have been exhibited.

"In the fourth degree movements are seen, except those of respiration, and they are incapable of being influenced by the patient. All the muscles are stiff, and the limbs hang down, or rest in any position in which they are supported. The breathing is deep, regular, and automatic, and there is much snoring. In this degree the patient always requires a persevering vaporizing of the vapour in order of operation. It lasts seldom more than two or three minutes after the inhalation is discontinued. The integrity of the functions of respiration and circulation is not impaired. The pulse is distinct, and however much deranged in previous stages, is little disturbed in this; the stiffness of the glottis and pharynx is maintained, and the patient swallows without difficulty. In the fifth degree the movements of respiration and circulation become impaired, and every care should be taken to prevent the action of the vapour from arriving at this point, as death may shortly ensue.

With regard to the quantity of ether required, and the time necessary, Dr. Snow makes the following remarks: 'The experimental practice of giving 30 per cent. air with air mixed with vapour of ether in the proportion of 45 per cent. to 55 per cent. air, and breathing it easily and without obstruction, he usually commends about two drachms of ether per minute. It is not all absorbed, for the patient expired after the supposition of the trachees. At the end of the first minute he is usually in the first degree of asphyxia; of the second minute in the second degree; of the third minute in the third degree; and of the fourth minute in the fourth degree. If the inhalation is now discontinued, he commonly remains in this degree of asphyxia for one or two minutes, passes gradually back into the third degree, which lasts for three or four minutes, and then passes back into the second degree, lasting about five minutes, to give place to a feeling of intoxication and exhilaration, which lasts for ten or fifteen minutes, or longer, before it entirely subsides.'

The general effects of chloroform resemble closely those of ether. It is, however, a more potent remedy, and produces anesthesia more rapidly and certainly than ether. Hence it has been employed more generally. This substance was originally discovered by Liebig and D"ubene in 1831, and named chloroform. Dumas first pointed out that the liquid which had been called chloro ether, and chloride of carbon, was composed as follows, CHCl, and called it chloroform. Liebig and D"ubene, in subsequent researches, found that this was the chloride of the base formula. This substance is prepared according to the Pharmacopoeia of the London College of Physicians as follows:—Take of chloroform lime iv. lb.; rectified spirit os; water Ox; chloride of carbon broken into pieces, 2 lb.; discontinue the water into a retort, and then add the spirit, so that the mixture may fill only a third part of the retort. It is then heated in a sand-bath, and as soon as ebullition begins the heat is withdrawn. The liquid is then distilled into a receiver. A quart of water is then added to the distilled liquid and well shaken. The upper portion which subsides is then separated, and the chloride of calcium added to it, and frequently shaken for an hour. The liquid, which is called the chloroform, is a clear, limpid, and silvery glass receiver. It is a transparent colourless liquid having a specific gravity of 1.48. It boils at 140° Fah., and the density of its vapour is 4.5. It has a fragrant ethereal apple-like, and a slightly acid sweet taste. It is sometimes soluble in alcohol, and otherwise insoluble in water for its solution. It dissolves camphor, Indian-rubber, wax, and resins. It is not inflammable. This substance is sometimes given internally in doses of from five to ten minims, and acts as a stimulant sedative antispasmodic and anaesthetic.

Administered in the form of vapour as an anaesthetic, chloroform is much more powerful than ether. This effect seems to arise from its being more sparingly soluble in the blood than ether. The quantity of chloroform is sometimes prolonged. snow, "required to induce insensibility is less than one tenth as much by measure as in the case of ether. Viewed in this manner, it is more than ten times as strong; but to ascertain their comparative physiological power, and other is required to produce the same amount of insensibility in the adult, this would saturate 257 cubic inches of air at 60°, making it expand to nearly 300 cubic inches, which would be breathed in 12 ordinary respirations of 26 cubic inches each. The quantity of ether usually required to produce the same amount of insensibility in the adult, is about 75 fluid drachms; this would saturate 440 cubic inches of air at 60°, and increase its volume to rather more than 800 cubic inches, which would require 32 ordinary respirations to breathe it. We see, therefore, that 12 inspirations of air charged with vapour of chloroform are equal to 32 similar inspirations of air charged with vapour of ether, at the same temperature; and that, consequently, chloroform is nearly three times as strong as ether. In some instances, however, the effect of chloroform is less than this, for ether absorbs much more caloric than chloroform during its evaporation, thereby reducing the temperature of the air passing over it, and the sponge or whatever contains it, and hence limiting its own evaporation, in greater degree."—Edinburgh Medical and Surgical Journal,' No. 180.

It is on account of its greater strength that a larger number of accidents have occurred with chloroform than with ether. As chloroform is much less soluble in its administration, there seems to be no reason why chloroform should not be employed for the production of anesthesia. The usual method of administering this agent is to sprinkle a few drops upon a handkerchief and apply it to the nostrils of the patient, and the patient may take air into the lungs, which is saturated with the vapour of chloroform. During this operation care should be taken that a larger quantity of the vapour is not
The inhalation than will produce the fourth stage of anesthesia. By removing the handkerchief from time to time the patient may be kept in the third or fourth stage, according as it seems desirable. Although the administering of chloroform in the handkerchief is undoubtedly the most simple and convenient plan, it appears to be much safer to use an instrument called an inhaler by which the quantity administered can be regulated and controlled with certainty. Such an instrument was early used by Dr. Snow, and the accidents which have occurred have certainly been fewer when this instrument has been employed than with the handkerchief. In the inhaler employed by Dr. Snow the vapour escapes by opening the valve, the chloroform is surrounded with cold water, to limit the quantity taken up by the air, and the expiration valve of the face-piece is so adapted as to admit additional air to any extent to dilute the vapour still further. From an investigation of the fatal cases, and experiments upon animals, Dr. Snow has arrived at the following conclusions:

1. Chloroform vapour, if it be inhaled in large proportion with seething air, destroys life by paralysing the heart.
2. In smaller proportions, but long continued, it produces death apparently by the brain, and by interfering with the respiratory function. In such cases the heart is found to beat after the respiration has ceased.
3. Chloroform vapour, if it be blown upon the heart, paralyses it immediately.
4. Atmospheric air loaded with from 4 to 6, or even 8 per cent, of chloroform vapour may be safely administered, inasmuch as that mixture will not act directly upon the heart, but only through the influence of the normal functions of the body. The average time occupied in producing insensibility is from three to four minutes.

In cases where an over-dose of chloroform has been administered, the only remedy which appears to offer a chance of relief, is artificial respiration. Where the muscles of the tongue become relaxed, and this organ falls back over the glottis, it should be pulled forward till the patient revives. It might be desirable to open the jugular vein in order to relieve the distension of the right cavities of the heart.

The cases in which ether was first employed, and in which it has since been recommended as an anaesthetic, are those in which operation is interfered with by nature, or by accident. There are no operations, from the extraction of a tooth to the capital operations of surgery, in which it may not be employed. At the same time it may always become a question in the mind whether ether is not preferable to the very slight and insignificant effects of the chloroform, and ether. The quantity of amylene consumed in Dr. Snow's inhaler was at the rate of rather more than a fluid dram in a minute, and in this way insensibility was produced. Although Dr. Snow successfully administered this remedy in several cases, he met with one fatal case, and has since abandoned its use.

Other substances are capable of producing anesthesia in the former vapour, but none of these have been generally employed.

(Snow, On the Inhalation of the Vapour of Ether, 1847; On Narcotism by the Inhalation of Vapours, Medical Gazette, 1849 to 1851; On Death from Chloroform, Lancet, 1856. Richer, Medicinae Therapeuticae Practicae, 1813, 1816.)

Artanthe elongata, the plant which yields the medicinal agent known by the name of Atanthe. This is the plant to which the order Picroceae, and the Piper is angustifolium of Ruiz and Pavon, the Piper elongatum of Vahl, and the Stephania elongata of Kunth. Although this plant has long been used by the Peruvians, it is not very well known in Europe, the root has been employed as a substitute for the alkaloid of the tree in British Guiana, where it is called Bibiru or Simi. This plant belongs to the genus Nectandra (Nectandra, &c. 1.), and to the order Lauraceae. It is a large tree 60 feet or
more in height, undivided by branches till near the top, and covered by an ash-gray smooth bark; the leaves are 6 or 6 inches long and 3 or 3 inches broad, nearly opposite, oblong, elliptical, slightly acuminate, coriaceous, smooth, shining, and obscurely notched on the upper side. Pannels few-flowered, flat withollowwhite; not including all think, oblong, without glands. The fruit is somewhat oblate, globular, and slightly compressed, 6 to 7 inches in circumference; the seed in each fruit, about the size of a wheat.

The heart used in medicine is the bark. It is derived from the trunk, and comes over in flat heavy pieces from 1 to 2 feet long, from 2 to 6 inches broad, and about 3 or 4 inches thick. The epidermis is brittle and of a grayish-brown colour. Internally the bark is of a cinnamon-brown colour. The fracture is rough and fibrous. The taste is bitter, astringent, and aromatic. The seeds also contain the beeberrine, on which the medicinal properties of the plant depends. The following is Dr. Macalani's analysis of the two-

<table>
<thead>
<tr>
<th>Beeberrine</th>
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<tbody>
<tr>
<td>2.56</td>
<td>2.20</td>
</tr>
<tr>
<td>Tannin and resins matter</td>
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</tr>
<tr>
<td>Soluble matter</td>
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</tr>
<tr>
<td>Sarcil</td>
<td>58.81</td>
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<tr>
<td>Fibre and albumen</td>
<td>62.92</td>
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<tr>
<td>Ashes</td>
<td>7.15</td>
</tr>
<tr>
<td>Water</td>
<td>3.15</td>
</tr>
<tr>
<td>Loss</td>
<td>6.45</td>
</tr>
</tbody>
</table>

The alkaloid beeberrine is obtained by decomposing commercial sulphate of beeberrine by ammonia; the precipitate is then dissolved in water, whilst still moist with moist hydrated oxide of lead, dried in a water-bath and exhausted rectified spirit; an alcoholic solution of beeberrine is thus obtained. The alcohol may then be distilled from the beeberrine. If this is heated with ether a part will be left underlying, which, though it is distinctly alcoholic, and called it beeberrine, but he now regards it as beeberrine in an oxidised condition.

When beeberrine is obtained from its ethereal solution, it is yellow, amorphous, resins-looking substance, but in the form of powder it is white.

The effect of the Bibeurrb bark is the same as that of cinchona. It is bitter and tonic, and possesses antiperiodic or febrifugal virtues. The alkaloid possesses the same properties, and from experiments which have hitherto been made by Dr. Macalani, it is not so powerful as the common cinchona, and it does not produce the headache, feverishness, singing in the ears, and other symptoms which are sometimes found to follow the administration of cinchona. In intermittent and remittent fevers, in neuralgia, and as a genuine tonic it has been recommended, and especially in those cases where quinine disagrees.

**Berirolletia.** (Berirolletia). CADEUM, LODGE OF. The preparations of iodine with the metals have many of them been found to be very efficacious in the treatment of disease both internally and externally. Dr. Garrod has recently recommended the iodide of Cademum for external application. "I had," he says, "previously felt the want of an agent containing iodine, and fitted for external application—not those usually employed, and having many objections. The free iodine, or iodine combined with iodide of potassium, as occurs in unguentum iodinii composition, P. L., is frequently too irritant in its nature, besides which its disagreeable odour, and the staining of the outside which it produces is often very objectionable.

"The simple iodide of potassium ointment, as ordinarily dispensed, is gritty in character, often to such an extent as to render it useless, and fit only for the more superficial applications. It is frequently becomes brown from liberation of free iodine; now, although these inconveniences may be removed by proper management and care as to the purity of the drug, nevertheless I am disposed to look upon the salt, when mixed with fatty substances, as not very readilys absorbed by the skin, and consequently not well adapted to produce the peculiar local effects of iodine which is often so advantageous to obtain; for it must be remembersoned that iodine is (not always used simply for its rubefacient or covering properties.

He adds, that the iodide of cadmium is not open to these objections. Mixed with eight parts of lard it forms a perfectly white and soft ointment, which produces but little local action upon the skin, and appears to be readily absorbed when properly applied with friction.

Dr. Garrod recommends this ointment in enlarged seco-

foldulous glands, in joints affected by chronic inflammatory disease, in various cutaneous diseases, and chillblains.

The iodide of cadmium crystallises in white 6-sided naecous tables, and is soluble in water and alcohol.

Cynoemic Acid has been recommended by Mr. Marshall as an escharotic and demulcent, and it is to be observed that in the case of jaundice, which is so frequently attended with jaundice, it is an useful and powerful remedy. He recommends 100 grains of the crystallised acid in an ounce of distilled water. In the 'Record of Pharmacy and Therapeutics' the following account of the application of this solution is given:—

"The solution is best applied by aid of a pointed glass rod, or, where a large quantity is needed, by means of a small glass tube drawn to a point. Only so much should be applied as will saturate the diseased growth, avoiding the surrounding healthy mucous membrane; for although the solution is not sufficiently powerful as an escharotic to destroy or even vesiculate the mucous membrane, it may give rise to an unnecessary amount of subsequent inflammatory action. A solution of iodine as small as which no serious consequences have been found to ensue. Any superinfectious acid may be removed by a piece of wet lint. The first effect of its application to the warts is to produce a slight smarting pain. If, however, any ulcerated surface is present in the part, or the wart is already more lasting, but not so acute and intolerable as that caused by the nitrate of silver, or by nitric acid, with or without arsenious acid. After a short time the pain passes off, but the discoloration continues, and this process is accompanied by an evident diminution in size. The best immediate dressing to the parts is dry lint, as that does not dilute the strength of the chronic acid solution, and is at the same time clean. Afterwards the lint should be changed twice daily, or, what appears to be better as a check to any inflammation, the parts may be washed with a solution of lead, and dressed with lint moistened in the same.

"In most cases of warts, one application suffices, the cure being completed in from four to eight days. The extreme is arrived at very quickly, and not so powerful as any sublimate or iodine, and it does not produce the headache, feverishness, singing in the ears, and other symptoms which are sometimes found to follow the administration of cinchona. In intermittent and remittent fevers, in neuralgia, and as a genuine tonic it has been recommended, and especially in those cases where quinine disagrees.

**Cud Livers.** Cud Livers Oil is an oil obtained from the liver of the common cod, Gadus Morhua, Linnaeus. This, and other oils from fish, have been for a long time popular remedies amongst people living on the sea-shore, especially those engaged in fishing. In 1785 it was recommended by Dr. Parvis as a remedy in chronic rheumatism, and in 1809 Dr. Barclay stated it was a popular remedy in many parts of Lancashire. In 1841, Dr. Bennett, of Edinburgh, wrote a treatise on the 'Oleum Jecoris Ashii,' recommending it especially in scrofulous diseases.

Although this oil is named after the Cod, from the liver of which most of the oil is frequently and abundantly obtained, other fish yield oil in their livers and adipose tissue with which this oil is frequently mixed. The oil sold in England usually comes from Newfoundland, where it is obtained by distillation of the livers of the innumerable codfish which are caught in that sea and exported to the country. As it comes into the market it is usually of a chestnut-brown colour, and has a fishy smell. It is now, however, subjected to a preparation, by which its colour is almost entirely removed and it is rendered a pale yellow. Although more agreeable to the taste, it does not appear that its therapeutical properties are improved by this process. The following is Dr. De Jod's analysis of the three kinds of oil which are to be found in the shops of London:—

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young children who will not take the oil, cream has been substituted with advantage.

In the case of rheumatism and scrofulous swellings the external application of the oil has been attended with advantage.

The friction of the whole body in cases of phthisis and scrofulous diathesis has also been strongly recommended by Dr. Lambossy.

When other remedies are employed in conjunction with cod liver oil, they may be added to this substance, and many preparations of this kind are kept ready for use by the practitioners. Such an objection has been urged against these compounds that if kept long the oil becomes rancid, and decomposition of the medicines take place. They are therefore best prepared extemporaneously.

Degenerators and Disinfectors. Although these terms are frequently used, the synonyms given have different meanings. Degenerators are substances which deprive decomposing animal and vegetable substances of their disagreeable smell; whilst disinfectants are agents which have the power of destroying the infectious or contagious properties, more especially of animal poisons. Many substances which have the power of effecting the first object, do not attain the last; and it is important to know that frequently when a foul smell is removed, an animal poison may yet remain which, whilst it may not be disagreeable to the sense, is not attended with any smell at all, as those of the small pox, typhus and scarlet fever.

One of the most powerful degenerators known is chlorine. This arises from its affinity for hydrogen gas which enters into the constitution of those gases which occasion the smell. In order to affect the sense in a disagreeable manner, as subpho-

The Cod Liver Oil

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Pale Oil</th>
<th>Pale Brown Oil</th>
<th>Brown Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oleic acid (with Gadic and other monobasic acids)</td>
<td>74-03000</td>
<td>71-75700</td>
<td>69-75000</td>
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<tr>
<td>Margaric acid</td>
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<td>Aspatic acid</td>
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<td>...</td>
<td>0-12506</td>
</tr>
<tr>
<td>Ferric and Choleie Acids with a small quantity of Magnesia, oleates, and billulfin</td>
<td>0-04300</td>
<td>0-06200</td>
<td>0-29900</td>
</tr>
<tr>
<td>Bilifolin, bilifluric acid and two peculiar substances</td>
<td>0-26600</td>
<td>0-44500</td>
<td>0-67000</td>
</tr>
<tr>
<td>A peculiar substance, soluble in alcohol</td>
<td>0-00100</td>
<td>0-00200</td>
<td>0-00500</td>
</tr>
<tr>
<td>A peculiar substance, soluble in water, alcohol, and other</td>
<td>0-00100</td>
<td>0-00200</td>
<td>0-00500</td>
</tr>
<tr>
<td>Iodine</td>
<td>0-05740</td>
<td>0-04000</td>
<td>0-02900</td>
</tr>
<tr>
<td>Chlorine and traces of bromine</td>
<td>0-14860</td>
<td>0-25890</td>
<td>0-06400</td>
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<tr>
<td>Phosphoric acid</td>
<td>0-01350</td>
<td>0-07900</td>
<td>0-03650</td>
</tr>
<tr>
<td>Sulphric acid</td>
<td>0-07100</td>
<td>0-05550</td>
<td>0-01010</td>
</tr>
<tr>
<td>Phosphorus</td>
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<td>0-01135</td>
<td>0-00541</td>
</tr>
<tr>
<td>Lime</td>
<td>0-12125</td>
<td>0-06000</td>
<td>0-01450</td>
</tr>
<tr>
<td>Magnesia</td>
<td>0-06800</td>
<td>0-01230</td>
<td>0-00380</td>
</tr>
<tr>
<td>Soda</td>
<td>0-03540</td>
<td>0-00810</td>
<td>0-00179</td>
</tr>
<tr>
<td>Loss</td>
<td>3-00943</td>
<td>3-06315</td>
<td>2-56000</td>
</tr>
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</table>

Although this oil has been recommended in a variety of diseases, and has been administered in a most injudicious manner, in all kinds of disorders, the cases in which it has proved most successful are those of a gouty, and rheumatic, and scrofulous character. It has been found especially serviceable in the rickets of children, and in cases of phthisis. When first given it produces nausea, indigestion, and even vomiting; but, when persevered in, it is usually not attended with any unpleasant symptoms. In order to derive benefit from its use, it must be continued for several weeks, and even months. One of its most striking effects is in cases where emaciation has set in, is its tendency to produce plumpness and to increase the nutritive processes in the system. Cases are recorded in which persons have increased several pounds in weight in the course of a few weeks under the use of this remedy. Whilst this increase of weight is going on, there is increased tone and vigour in the system, and persons frequently gain considerable strength under its influence. In cases of phthisis many of the more urgent symptoms are relieved by its administration, and sometimes the progress of the disease has been entirely suspended.

The dose at the commencement should be half an ounce three times a day, which may be increased to one or even two ounces, should the stomach be able to bear it. It is given on coffee, milk, or peppermint-water. A small quantity of common salt taken before and after the oil will sometimes cause it to agree when other means have failed.

The nature of the action of this oil has been much debated by medical practitioners. Whilst some are inclined to regard the small quantities of iodine and bromine it contains as the active agents, others attribute its effects to the oily acids, which it has in common with all other oils. It is well known that oil plays an important part in the development of the albuminous tissues, and is universally present in the eggs of the lower animals, and it is supposed that its influence is exerted in the system in cases of scrofula, or when the adipose tissue is manifestly deficient it has an effect on the nutrition of the tissues generally. If this were the case, other oils ought to act in the same manner, and to a certain extent this is true, as it has been found that other animal oils, and even vegetable oils, exercise a similar effect. At the same time, it has been found that cod liver oil is more digestible and less liable to disagree with the stomach than other oils, and it is consequently used in preference to all others. Anolegious diet has been found, however, a valuable adjunct to the use of the cod liver oil, and in

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ammonia-like compounds by that of a powerfully fixed alkali. The manganites and permanganates, on the other hand, destroy the smelling substances completely; containing, as they do, a large quantity of oxygen, the very agent which consecutively effects all natural disinfection, and give rise to an actual process of combustion, in consequence of which the cause of the odor or putrefaction is permanently removed. They resemble, in this respect, the alkalis and chlorides of lime, chlorides of lime, the action of which is likewise permanent. The hypochlorites act with less energy and rapidity than the manganites, and are in this respect inferior; but they have an advantage over the latter by their ability to diffuse the substances, in this manner odorous and putrefactive substances which are diffused in the atmosphere. But as the chlorine evolved is frequently found objectionable by, and injurious to, patients, it would be important to ascertain whether the same effect could not be accomplished by exposing the contaminated air to the action of extended surfaces of solutions of the manganites and permanganates, either contained in shallow vessels, or diffused over sheets of wire gauze.

The manganites and permanganates have, moreover, the advantage of possessing peculiar and strongly marked colours, whereby they are readily and safely distinguished from other compounds. In consequence of this marked colour they can be employed as a means of disinfecting and securing the natural sterility of substances by the instinctual and correct use of hypochlorites, or of metallic salts, are scarcely possible with the manganites and permanganates, which are, moreover, in themselves comparatively innocuous.

The granules of permanganate of potash in a pint of water has been of much service as an application to phagedenic ulcerations, and to sloughing sores in various parts of the body. It has also been found particularly beneficial as an application to cancerous sores, where the smell is sometimes very offensive.

Where clothes, bedding, and other materials have been in contact with poisonous effluvia, one of the most powerful disinfectants is heat. The application of heat to such articles may either be effected by subjecting them to the action of boiling water, or exposing them to heat in ovens or closed vessels constructed for the purpose.

(See Minute of Information on Disinfection and Deodorization, published by General Board of Health, 1857.)

PHOSPHORUS. [Physic, Practice of, S. 2.]

HYDROPHOROUS ACID is a compound of phosphorus and oxygen, in the proportion of one equivalent each of them. It may be prepared by the decomposition of phosphide of benzol, by exposing it to the action of the alkalis and oxides of the metals, forming hypophosphites. These substances have lately been introduced into medicine as a remedy for pulmonary consumption. In a paper presented to the Academy of Medicine, in Paris, Dr. Quinault has proposed the use of a solution of hypophosphorus acid as a method of commencing phthisis, which he had treated with these remedies. Out of this number he states that nine recovered; in eight the evidences of disease disappeared; and in eleven, much improvement took place, and eleven died. Dr. Churchill believes that the immediate cause of tuberculosis is the decrease of phosphorus in the system.

The specific remedy, he says, "of this complaint consists in the employment of a preparation of phosphorus which has been converted into phosphoric acid by immediate assimilation, and the second of being at the same time in the lowest possible state of oxidation. The hypophosphites of lime and soda are the salts which have hitherto employed these two characters in the most complete manner. Either of these salts, administered in doses varying from ten to forty-five grains per day, may be used in the treatment of phthisis. The highest dose which I have given to adults has been fifteen grains per day."

These preparations have a direct action on the tubercular disposition, and dispel with a really wonderful rapidity all the symptoms which characterise the disease. When the morbid deposit which is the special result of the disease is obliterated as the only incident, and does not take place too rapidly, the tubercles are removed by absorption, and disappear without leaving any trace. When the deposit is ole of dose, and the softening has reached somewhat a higher degree, the breaking down process may continue in spite of the treatment, and the issue of the case will depend on the pathological peculiarities of the lesion, on its extent, and especially on the presence or absence of complications. I have made several unsuccessful attempts to meet this local mischief by means of inhalations of several substances, but I have obtained no favourable results except such as were owing to the general treatment.

The physiological effects which I have observed during the administration of the hypophosphites of soda, lime, potash, and ammonia, prove that these salts have a double action. On the one hand they immediately increase the principle (whatever it may be) which constitutes nervous power, and, by increasing it, still further and very much, their great breeding agents, far superior to any hitherto known. These preparations possess in the highest degree all the therapeutical properties attributed by former observers to phosphorus, and are devoid of the dangers which have almost consigned this substance to oblivion. It cannot be doubted that hypophosphorous preparations will henceforth rank foremost in therapeutics."

The salts of hypophosphorous acid can be prepared by adding the bases to a solution of the acid in water.

Hyposphorite of Potash occurs in the form of a white opaque powder, readily soluble in water and in alcohol. It is very deliquescent, and ought to be kept in stoppered bottles.

Hyposphorite of Soda crystallises in nacreous rectangular plates. It is a less deliquescent salt than the last, and dissolves readily in alcohol and water.

Hyposphorite of Lime crystallises in rectangular or square-sided plates, which are not deliquescent, and possess a bitter taste. It is perfectly soluble in water and is the most convenient form for administering the hypophosphites.

Hyposphorite of Ammonia has a similar appearance to the lime-salt. It is, however, deliquescent in the air. When heated gently, it gives off ammonia, and leaves hydrous hypophosphorous acid.

IDANORM, a compound of iodine, and the compound radical formyl. It was discovered by Scullas, and has recently been investigated physiologically and therapeutically by MM. Moretin and Humbot. It is a solid body occurring in pretty scales of a sulphur yellow colour, friable, not to the touch, of a persistent aromatic odour, with a mild and uncorrosive taste. When this substance is administered to animals, it drives them from smaller doses than of iodine, and exhibit symptoms of great depression and exhaustion. The symptoms of depression are followed by convulsions, contractions, and other effects upon the nervous system. After death they exhibit no signs of any marked lachrymose action.

The authors above mentioned suggest that this remedy may be employed in all cases where iodine is indicated. It is more rapidly absorbed into the system than iodine, and produces none of the local irritations which have been observed by those who have employed this remedy in small doses, from its soothing properties in neuralgic disorders. They have also employed it with success in goitre, scrofula, rickets, and syphilis. The dose is from half a grain to eight grains in the course of the twenty-four hours.

Kosso or Kvasso, the Abyssinian name for the flowers of the Brayera anthelmintica, a plant belonging to the natural order Rosaceae. The Kosso has been recently introduced into Europe by Dr. Brayer, from Abyssinia, and is of the highest value. It has been known in Abyssinia upwards of two centuries, as an anthelmintic, and has been mentioned by several writers. The plant which it yields it has been named after Dr. Brayer, a Jewish physician who resided a considerable time at Constantinople, and having had opportunities of witnessing the anthelmintic properties of this plant, brought some of it to Paris in 1823. On being sent to Kunth, he found it to be a new genus of plants belonging to the order Rosaceae.

The Brayera is an Abyssinian tree twenty feet in height, with round rusty tonentose-villose branches, marked by the annular electricities of the fallen leaves. The leaves are crowded, alternate, and sessile at the base of the petioles. The flowers are oblong, sessile, villose at the margin and on the nerves of the under surface. Stipules adnate to the petiole. Flowers dioecious, small, and greenish, the calyx with the tube bibracteate at the base and turbinate; throat constricted internally by a mem-
branched and produced a few leaves on the stem. It is a plant of the genus 
Tetraneuris, a species native to the Alps. The flowers are small, white, and 
petals are thin and translucent. The leaves are narrow and linear.

The plant grows in the Pyrenees and Alps, and is cultivated in France. 
Dr. Wettstein, a botanist, described the plant in a paper published in 
1854. He noted that the flowers are small and delicate, with petals that 
are thin and translucent. The leaves are narrow and linear. The plant 
is a member of the family Ranunculaceae, and is commonly known as 
Tetraneuris acaulis.
ridges 3, only dorsal; vitre, one to each dorsal furrow, and two to the laterals; albumen, thin flat.

N. Assafetida, Falconer: Radical leaves 3-parted; segments, bipinnatifid with oblong-lanceolate, obtuse, dentate lobes. Root of the plant is tuberous, taprooted. The pith, increasing to the size of a man’s arm or leg, covered with a blackish coloured bark near the top with many strong rigid fibres; its internal substance white, fibrous; abounding with a thick milky juice, which has an excessively strong odour, and is surpassed in two yards high, with one more, six or seven inches in circumference at the base, smooth, radical leaves nearly two feet long. The fruit is flat, thin, reddish brown, like that of a prapin, only rather longer.
THIERRY, JACQUES-NICHOLAS-AUGUSTIN, the distinguished historian, was born at Blois on May 19, 1793. In 1803 he commenced his studies in the college of his native town. He entered the military school, and in 1813 he became a teacher in a provincial school. In 1814 he went to Paris, enlisting himself as an adherent of the socialist principles of the Count St. Simon, of whom he became the friend and associated contributor to the publication of 'Les Rapports et Correspondances.' He however shortly penetrated the fallacy and shallowness of his master's doctrines, abjured them, and became with Comte and Duroc the editor, in 1817, of the 'Censeur Européen,' as a consequence of which it was believed that he first formed the theory of the continued existence of two classes in England— the Norman masters and the Saxon servants,— whose successive struggles he traced down to the time of Charles I. In an essay in this paper, and which, with much perplexed ingenuity, he pursued his course; but on receiving several other letters of disapproval, the editors wished him to vary his subjects. This he declined doing, and he ceased his contributions in January 1821. From that time he turned to his historical studies. However, he had to pursue his increased difficulties as approaching blindness rendered him unable to read, but he bore the deprivation with philosophical calms. In 1822 he published his 'Histoire de la Conquête de l'Angleterre par les Normands,' a work which, despite his false theory of the ever-enduring difference of classification of the two races, is of a high merit, as displaying great power of acute discrimination, the result of vast labor digested by a well-regulated mind, with great ability detected under the severities of the time, and an animal style. It has gone through many editions and has been translated into English and German. In 1827 he issued his letters from the 'Courrier Français' in an extended, and collected form under the title of 'Lettres sur l'Histoire de France,' which have also been translated into English. In 1828 a nervous disorder, added to his now rapidly falling sight, occasioned his being sent by his medical adviser to Évry, near Théméricourt, on the Yèvre, the sequester of the sequestered. While residing here for nearly two years, he was elected a member of the Académie des Inscriptions et Belles-Lettres, and was created a member of the Legion of Honour, of which he was appointed its office. The years 1831 to 1835 he passed partly at the warm baths of Lourmarin, and partly at Voseli in Haute-Saône, during which time, with the assistance of his brother, he composed his 'Dix Ans d'Études historiques,' a series of excellent essays, the product of his previous investigations, which was published in 1835. At this time, he was called to Paris by Guizot, who was then minister of public instruction, who confided to him the editing of a 'Recueil des Documents inédits de l'Histoire du Tiers-Etat,' which forms a part of the 'Collection des Documents inédits de l'Histoire de France.' In 1840 he published his 'Récits des Temps Mérovingiens, précédés des Considérations sur l'Histoire de France,' to which the Academy awarded their prize, and of which there is an English translation. A collected edition of his works was published in 1855. He died May 21, 1856.

As an historian Thierry takes rank with Michelet and Guizot. Less profound in philosophical dissertation than Guizot, less eloquent and imaginative than Michelet, he excels both in the number of groups of large masses published and of seeing and presenting every point of interest or importance; he combines picturesque effects with minute knowledge; and his style is earnest and lucid though not striking. He was also the merit of maintaining consistently devoted to his vocation. While many French writers of eminence looked forward to political influence or employment as his reward—and many continued to attain them, too often by a sacrifice of their previous principles or principles of art held on every undeviatingly. His consolation under various afflictions he has himself stated: 'Blind and suffering, without and without interruption, I will give this testimony which from me no one will disbelieve; there is nothing more powerful, better than property, better even than health; it is a devoted attachment to a science.'

JULIE THIERRY, whose maiden name was Guizotfranche. To the town of Lyon, in January 1831, and was of service to him in his then state of total blindness. In 1836 she published 'Séances de Mours aux 18me et 19me Siboles, for which her husband wrote an introduction. She was also the author of a number of ool very essays in the 'Revue du Département.'

THOISINAMEIN. [Chemist, &c.]

THOM, JAMES, who acquired considerable temporary celebrity as a sculptor, was born in Ayrshire in 1799. He was brought up as a stone-mason, and taught himself the art of sculpture. He began with models of them were produced in great numbers. There is undoubtedly a good deal of humour and spirit in the figures, but they are rude and inartistic in conception and execution, as those who have no self-taught sculptor himself. He afterwards executed a statue of 'Old Mortality,' and several other works; but he appeared to be falling into comparative obscurity when, about 1836, the misconduct of an agent whom he had employed to manage his business, brought the 'Tan O'Shanter' and 'Old Mortality' in the United States, led Thom to proceed to America. Eventually he determined to remain in New York, where he found considerable professional employment. He also devoted some time to assisting the sculptor with his own designs, and became a tolerably prosperous man; but he seems to have gradually abandoned the use of his chisel. He died at New York on the 24th of April, 1850. The original figures of Tam O'Shanter and Souter Johnnie, are placed in a building attached to the Burns monument on the banks of the Doon; there are copies of them in England, and at Mr. Col's, Paterson, New Jersey. His group of 'Old Mortality' stands at the chief entrance of the Landmark City Park, New York.

THOM, WILLIAM, the weaver-poet of Inverary, was born at Aberdeen in 1799. At ten years of age, with barely the elements of education, he was bound for four years apprenticeship to a weaver, and during this time, as he narrates in his 'Tan O'Shanter,' his experience during this time, he had a wish to undertake Latin, but being 'defeated in want of time.' At the end of his apprenticeship he was engaged at another factory, where he worked for seventeen years, learned to play the 'Germant flute,' and to 'every Scotch song that is worth singing.' He married about 1829, had a family, and after some other removals settled for a time at Newtyle, near Cupar-Angus in Forfarshire. He was there when the great commercial failures in America occurred, one consequence of which was the cessation of employment for the poor hand-loom weavers. With a wife and four children, without work, in a neighbourhood where nearly all were as poor as himself, and in a country where poor-laws were not yet introduced, the sufferings of the family were extreme, and in a cold spring day, in 1837 they resolved to set off to walk to Aberdeen, in hopes that there might procure employment. Of this journey he has given a vivid and pathetic narrative. One child died on the way of illness in means of provision. He then obtained work, first in that town, and then at Inverary. In November 1840 his wife, whose health had been weakened by her late sufferings, died in childbirth. His new afflicts again drove him to poetry, realising Shelley's assertion that poets 'learn in suffering what they teach in song'.
He sent one of his compositions, 'The Blind Boy's Franks', to the 'Aberdeen Herald', where it was inserted with much commendation. It attracted the notice of Mr. Gordon, of Kincardine, who immediately relieved and patronised him. He had other poems by him, which were produced and admired, and he was brought to London, feasted at a public dinner, and received that sort of notice which has so injurious an influence in the case of Burns, a patronage that only enhances the bitterness of the fate to which its objects are almost inevitably consigned.

Thom returned to Inverary, resolving, he said, not to be too much elated by the applause he had received, but it was in vain trying to suppress its effects, and he finally gave the appearance of monographs on the distribution of animals in Europe.

THOMSON, ANTHONY TODD, was born in Edinburgh on the 7th of January, 1778. His father, by birth a Scotchman, but afterward became a naturalized citizen of America, where he held two lucrative appointments under the Board of Postmasters-General for the province of Georgia, and Collector of Customs for the town of Savannah. Having refused to take the oath of allegiance to the American government, on the breaking out of the Revolution he was compelled to relinquish his appointments, and returned to Edinburgh. Anthony Todd was born previous to this, whilst his mother was on a visit to Edinburgh. He received his education at the High School, Edinburgh. When a boy he was apprenticed to Dr. Lord Cockburn, which lasted till his death. His father destined him for business, but having obtained a clerkship in the Post-office, he was enabled by the leisure it afforded him to become a medical student.

He attended the lectures of Munro, Gregory, Black, and Dugald Stewart. In 1798 he became a member of the Speculative Society, and the companion of Jeffrey, Horner, Brouqham, and Lord Landsdowne. In 1799 he became a member of the Royal Medical Society, and in 1806, when he graduated in 1799, he left Edinburgh, and established himself in London about the year 1800. He commenced the practice of his profession in Sloane-street, Chelsea, as a general practitioner. He was a most active, but at first, slow, physician. In the course of a regular practice he was called into the midst of a large general practice, he found time to cultivate science and literature. He was mainly instrumental in procuring the enacting of the Apothecaries' Act in 1814. His first literary work was published in 1810, and entitled 'Conspectus Pharmacopoeiae.' He sold the copyright of this book for twenty pounds. In 1833 it was bought by the Messrs. Longman, for two hundred pounds. It has gone through fourteen editions. In 1831 he published the 4th edition in London in a very small quarto, which contained 546 pages. It contained a critical account of all the medicines and their compounds which were in use in Great Britain. It has been translated into several European languages, and ten editions have been published in this country. The searches into the materia medica he was impressed with the importance of the study of botany, and he was one of the first to give a course of lectures on this subject in London. In 1821 he published a first volume of his 'Lectures on Botany,' which contained many very valuable observations on the structure and functions of plants which have since become a part of the science of botany. In his observations, he made extensive use of the microscope, and may fairly claim to be one of those who appreciated the value of this instrument when its use was generally neglected. In 1826 he became a member of the Royal College of Physicians of London, and commenced practice as a consulting physician. In 1828 he was elected Professor of Materia Medica to the University of London; now University College. In this position he worked with great ardour at the subject of Therapeutics, and was one of the first to introduce the new substances discovered by the chemist into the practice of medicine. He formed here a very fine collection of specimens of materia medica, but the occurrence of a fire put an end to the collection in 1831. Three of these were devoted to the birds. He did not live to complete his work. He had been mainly instrumental in inducing the British Association to meet in 1832 in Belfast. In promoting this object he came to London in the January of that year, when he was seized with paralysis, and died in the course of a few hours. The manuscript of another volume on the 'Natural History of Ireland' was found after his death in a sufficiently advanced state to be given to the public, and this was published with a short memoir of the author by the late Sir Smith, Bart., in all the local institutions of his native town. He was president of the Natural History and Philosophical Society of Belfast, member of the Royal Irish Academy, and Fellow of the Linnean Society. William Thompson is a remarkable instance of a man who, by the devotion of average talents to one great object, succeeded in his work on the natural history of Ireland in achieving for himself a lasting reputation, and perhaps almost as much as he did for his species. The most valuable monographs on the distribution of animals in Europe.
he was engaged in preparing 'A practical Treatise on Diseases affecting the Skin,' which has since been completed and edited by Dr. Parkes. In 1846 his health first began to fail. He continued to give his lectures, with considerable interruptions, till the following summer, when he was obliged to retire into the country, and died of bronchitis at Ealing, June 14, 1848.

Dr. Thomson was a man of unwearied industry, and throughout his long career, pursued his labours with few or no interruptions. He was a man of varied attainments, cultivating literature as well as science; he was not an undistinguished contributor of literary articles to the Magazines and Reviews. He translated from the French, and edited, with a work by Mons. Salvarte, entitled 'The Philosophy of Magic, Omens, and Apparent Miracles.' His notes to this work were afterwards published in a separate form, and inserted in the 'Repository.' He also edited also an edition of Thomson's 'Seasons;' to which he appended a large number of notes, and a life of the author. He contributed many articles to the ' Cyclopaedia of Practical Medicine.' He was for many years editor of the 'Medical Repository,' to which journal he also extensively contributed. One of his last works was entitled 'Domestic Management of the Sick-room,' of which several editions have been printed. A sketch of his life, from which this notice has principally been obtained, is published with his posthumous work on 'Diseases of the Skin.'

THOMSON, THOMAS, M.D., a celebrated chemist, was born April 12, 1773, at Crieff, Perthshire, and received his early education at the parish school of that place. Afterwards studied at St. Andrew's and Edinburgh, and was a pupil of the celebrated Dr. Black. In 1802 he delivered a course of lectures on chemistry, and continued to lecture on this science for nearly fifty years. He was one of the editors of the 'Encyclopaedia Britannica.' From 1796 to 1800, and wrote the articles 'Chemistry,' 'Mineralogy,' &c., in that work. In 1802 he published his 'System of Chemistry.' He first suggested the use of symbols in chemistry, which was afterwards adopted by his contemporaries. He was one of the first chemists who recognised the value of Dalton's atomic theory, and devoted himself to its elucidation. He also at this time conducted for the Board of Excise a series of investigations on brewing, which formed the basis of Scottish legislation on that subject. In 1813 Dr. Thomson came to London, and started the 'Annals of Philosophy,' a scientific journal, which he edited till the year 1822, when he resigned it to his friend Mr. Richard Phillips. In 1827 this journal became merged in the 'Philosophical Magazine.' In 1817 be was elected lecturer on chemistry in the University of Glasgow, and the following year received the title of professor. This chair he held till his death, assisted in his later years by his nephew and son-in-law Dr. Richard Thomson. In 1833 he published 'Outlines of Mineralogy, Geology, and Mineral Analysis,' and in 1849 a work on 'Brewing and Distillation.' He died on the 2nd of July, 1852. His son, Dr. Thomas Thomson, is celebrated for his botanical knowledge; he has published an account of his travels in Tibet, and is now the superintendent of the East India Company's botanical gardens at Calcutta.

THREE RIVERS. [CANADA, S. 2.]

TIRIP, the name of the Statiche Armeria, Smith, now Armeria maritima. Armeria belongs to the natural order Plumbaginaceae. It is distinguished by the flowers being in a head contained in an inverted cylindrical sheath, and the capular fruit not bursting. A frequent plant in the dunes, growing on mucky and rocky sea-shores and on the banks of salt-water marshes. It bears transportation to gardens, where it is a favourite in forming the borders of flower-beds. It may be easily cultivated from other species by its linear 1-nervef leaves. It has rose-coloured flowers. Several varieties are described.

THEUREA. [Noswella.]

TIECK, CHERNISCHKA, 1756-1806, a celebrated sculptor, brother of Ludwig Tieck, was born in Berlin on the 14th of August, 1777. Having studied awhile under Schadow, he in 1798 proceeded to Paris, where he became acquainted on the 1st of January, 1800, he returned to Berlin, and afterwards went to Weimar, then a centre of literary and artistic activity. There he found Göthe a warm and most valuable friend and adviser, and whilst he not only assisted in the execution of the sculptural decorations of the new palace, but executed busts of Goethe, Voss, and Wolf, besides many of members of princely and noble families. In 1805 he went with his brother Ludwig to Italy, and carefully studied the great works of art there, maintaining at the same time by his numerous busts, &c., his independence as an artist. Here he became acquainted with Madame de Stael, and the crown-prince, afterwards King Ludwig, of Bavaria. For the former he executed a relique for the family sepulchre at Coppel, and ennobingly a bust of her and her son, and for the latter some busts of Broglic, Augustus Schlegel, and M. Rosenberg. For Ludwig of Bavaria he executed at various times busts of Ludwig himself, Jacobi, Schelling, Ludwig Tieck, Lessing, Erasmus, Grotius, Herder, Wallenstein, and several others, chiefly for the Kieler Dom. In 1812 he became acquainted with Rauch, and the two great sculptors ever after remained fast friends. He returned in 1819 to Berlin, where he established his atelier, and was elected a member of the academy. During the remainder of his life he was employed upon many of the public works, and was a prominent actor in the artistic movements in the Prussian capital. Among his productions were the friezes, the sculptures in the pediment, and other external decorations of the Theatrical Royal, the gallery of the Elector, the edifice of the cathedral in Berlin a series of fifteen seated marble statues of classical personages for the royal palace; a bronze equestrian statue of Frederick William at Krippen, besides several monumental works and statues. Tieck has been during the last thirty years extensively employed on the restoration of ancient works for the Royal Museum, in which institution he was director of the department of sculpture. He died at Berlin on the 14th of June, 1851. Tieck was not possessed of a manual dexterity, but an uncommon sagacity of mind, and revelled, but his chief strength lay in his memorial busts, many of which display great elevation of style and admirable chiselling. In his studio several eminent sculptors have formed, among whom perhaps the best known is Kiss, the sculptor of the Amazons. There are casts of some of Tieck's works in the Crystal Palace at Sydenham.

TIECK, LUDWIG, one of the most influential actors upon the modern literature of Germany, was born in Berlin, on May 31, 1773. At the universities of Halle, Göttingen, and Erlangen, he studied with great arcaud; history and the poetical literature of both the ancients and the moderns being his favourite pursuits. His poetical powers developed themselves early, but they took a direction opposite to the poetical. His moral sense and his general judgment, his feelings and opinions of what may be termed the Christian chivalry or romance of the Middle Ages, although his first efforts, 'Almamur,' a prose idyll, in 1796, and 'Alaunga,' a romantic drama, were poetical, save in a form of eastern locality. Both displayed great poetical ability, but he did not attempt verse, except in a few short pieces introduced amid the prose. In 1792 he produced the tragedy of 'Der Abscheulich,' (The Farting), also in prose; which, like most of his other dramatic pieces, is more laid for the closet than the stage. He probably himself began to perceive that his true strength lay in narrative, and in the same year he produced 'Das grüne Band,' a medieval tale of considerable pathos, with great truth of characterisation and psychological interest; and 'Abdallah,' an oriental tale, with little of oriental colouring, and of a ghastly terrifying character. He had made much progress in the study of English literature, particularly the drama, and he had formed a decided preference for the romantic character and scenery intended to be English, but they have a more poetic tone of the whole is more gloomy than most of Tieck's productions.

The six years, from 1786 to 1800, both inclusive, was a period of intense literary activity. During this time he visited Jena, where he formed an intimate friendship with the two Schlegels, Novalis, and Schelling; Weimar, where

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he became acquainted with Herder; and Hamburg, where he married the daughter of a clergyman named Alberti. The intercourse with the above-named literary celebrities had much influence on his future course. While still adhering to the romantic school, his productions ambitioned a wider field. He continued to write tales, novels, tragedies, and comedies; but in embodying nursery tales, as in his 'Blumhart,' a play in five acts, 'Die Sieben Weber der Ältesten,' he displayed the earliest intimation of a turn to the_domestic, as in 'Leben und Tod des kleinen Röthkäppchen' (Life and Death of Little Red Riding Hood), a tragedy in three acts, he united much of the simplicity of the old traditions, with the added interest of poetical conception, a close adherence to a particular style, and a fine sense of the picturesque and of humour. Occasionally he took for his subject legends of a higher character, as in his 'Leben und Tod der heiligen Genoveva;' and in 1804, in 'Kaiser Oktavius,' a work which had been long expected, and which his countrymen consider as one of the most successful of his romantic productions. To this he has prefixed a long prologue, in which various characters are introduced to display the proaic element, and a poet, to whom comes Romnaene, a female, who describes herself as insinuous, joy throughout the world, and says that her father is Faith, and Love her mother. In this prologue, and in the following play, which is partly in prose, is found the most favourable specimen of Tieck's versification. It is not of the most careful construction; and there is little consistency in the line of his verses, or in the judicious poetical, the best examples of them are found in his prose. This line was followed out in subsequent works, as in 'Fortuna,' which however embodies a commendable amount of good-humoured satire on the various conditions of the estate. These pieces are styled by the Germans Art- Novels, to which belong 'Franz Sternbald's Wanderungen,' 'Phantasien über die Kunst,' and 'Zur/secenmessungen eines Kunstliebenden Klosterbruders' (Heart-throben of an Art-loving Monk), written in conjunction with his friend Wackenroder, in all of which he displays a love and knowledge of the beautiful, and elevated in art, a contempt for the self-complacency of affected connoisseurship, and a manifestation of Roman Catholic feeling, to which faith he for some time adhered about this period. Perhaps less distinctive as a class, as his previous tales had much of a similar character, were his 'Volksmärchen' ('Popular Legends'), such as the history of Heymon's Children, the 'Faë Magelle,' Melusine, &c., legends which are in German, and the 'Denkwürdige Geschichtstornik der Schildbürger' (Memorable History of the Simpletons), a sort of German version of our Men of Gotham; tales in prose, abounding in pleasant fancy, incident from which the author has not been unwilling to imbibe humour, and told with a simplicity and an apparent childish belief in the wonders related that give an indescribable charm to the whole. Upon yet another class he evidently bestowed more thought and labour. In the dramas, for the stage, that he has written throughout his productions, he has always endeavoured to interest and to instruct, and to please. In the 'Journey to Etna' (Tieck's 'Voyage to Etna'); in 'Prinz Zerbino, oder die Reise nach dem guten Gesuchsther' (Travels in search of Good Taste); 'Die verkehrte Welt' (The World turned upside down); and 'Leben und Taten des kleinen Thoma, genannt Dümchen' (Tom Thumb); in all of which he attacked with keen irony the low, material, anti-poetical notions of poetry advocated by learned pedants, and defended by implication, by example, and by occasional parodies on the classics, the theory of the German national school was, however, that Tieck was acquainted with the peculiarities of all the authors alluded to in that drama, would possess much interest for the English student. These pieces, independent of their critical merits, have an interest of their own from the variety of the characters, the genuine and humorous life of many of the characters, and from the skilful manner in which the events of this period, including most of those above-mentioned, were subsequently published together, under the title of 'Phantasius,' in a frame-work of a conversational party, to which the names of many of the characters. Many of the characters, introduced into this work, were first introduced as characters in Tieck's 'Voyage to Etna;' 'Don Quixote,' a very good one of Ben Jonson's 'Epicoene,' or the Silent Woman,' and a remarkably successful one of Shakspere's 'Tempest,' also belong to this period. In 1801-2, while residing in Dresden, he assisted F. Stein, who edited the new edition of the 'Faë Magelle,' to which he contributed some of his tales. He then lived for a time at Berlin, and next at Ziebigen near Frankfurt-on-the-Oder, seeming to enjoy a poetical leisure, during which he produced nothing but 'Kaiser Oktavius' of which we
unhappy fate of Canaues is pathetically related. In 1826 he also produced one of his most picturesque narratives, "The Torpe Dog," in the Cevennes is graphically told, but unfortunately was left incomplete. While residing at Dresden his evening circles became celebrated, at which his readings and the relation of his tales formed a principal charm, and which were eagerly anticipated by the German buffs. The stories he created were in the vicinity and could gain admission. In 1836 and 1840 he published his two latest novels—"Der Tischlermeister" (The Cabinet-maker) and "Victoria Accorumbones," both of which are among the most of his previous works of a similar character. He also took an active part in the management of the Dresden theatres. In 1840, on the accession of Friedrich Wilhelm IV. to the throne of Prussia, Tieck was invited to Berlin, an invitation which he accepted. Here he created the "Privy-councilor" and passed the remainder of his life partly in Berlin and partly at Potsdam, occupied chiefly with some theatrical productions, and in revising and correcting his works, which were published in 20 volumes at Berlin between 1826 and 1846. At various times he also edited Rovally's "Schriften," in conjunction with Friedrich Schlegel, 1802; Heinrich von Kleist's "Nachgelassenen Schriften" (Posthumous Works), 1826; Solger's "Nachtla und Briefwechsel" (Remains and Correspondence), 1825; and Reinhard Lenz's "Gesammelte Schriften," (Collected Works) in 1828. After suffering for some years from continued illness, born with wonderful patience and cheerfulness, he died at Berlin, April 28, 1835, leaving a name which may rest upon the record of his name in German literature, and no Englishman may reverence as that which in Germany is most connected with the popularizing of the fame of the great dramatic poet of England.

The Tila, a genus of Plants belonging to the natural order Orchidaceae. It has a 2- or 4-parted calyx; petals 3 or 4, olling acuminate; scales none, or very small; carpels 3 or 4, somewhat constricted in the middle; 2-seeded. The species are small glorious annual herbs, with spike-shaped and globose,eh umbilum places. The leaves are opposite. Flowers small, white, for the most part axillary. T. meccica is a native of Europe in many places, in dry, barren, sandy, and gravelly soil; plentiful in Britain on the most barren sandy heaths, and frequent in Norfolk and Suffolk. It has a stem branched and decumbent at the base; flowers axillary, sessile, and trifid. The plant is very minute, and of a reddish colour. The leaves are opposite, oblong, obtuse, concave above, connate; sepals oval, and by opposite, brittle-pointed. Petals nearly subulate, white, tipped with red. There are several other species, natives of North and South America and Australia.

TINALCOL [Boroqo AGLI].—The Tinalcol, a family of small Moths, which are remarkable for depositing their eggs among animal substances, on which their larvae afterward feed. They are thus constantly found upon clothing made of hair or fur, and are called Clothes-Moths. The family is thus defined—"Antenen moderate, slender, simple, pubescent beneath in the males; proboscis short; thorax rarely crested; body long and slender; wings entire, often narrow, mostly convoluted in repose. The caterpillar live in portable cases formed of various materials. These moths are often ornamented with very brilliant colours, the upper wings having gold or silver spots. The caterpillars make their cases of the substances on which they feed. The Adele make their nests of bits of leaves. The true Tines-cl themselves with the hair of the skins of animals and bits of silk. When too small, they stuff their cases and make them larger. Many of them burrow into skins, silks garments, &c., making cases as they proceed. They are widely spread, and are very destructive."

TIPON [SUFFOLDIUM].—TIPULIDE, a family of Dipterous Insects belonging to the tribe Agromyzidae. They have the antennae longer than the body, and not sheathed; eyes entire, ocelli obsolete; front of head beaded; proboscis short, ending in two large fleshy lips; body elongated; wings long, nervures numerous; legs long. One of the most common of this family is the species of Ctenophora, Pseudocella, and the species of Tipulids which are usually known by the name of Daddy-Long-Legs.

Laubreville divides this family into five smaller groups—Culiciformes, Gallihoes, Teriroides, Fungivores, and Florales.

The Culiciformes (Chironomides, Maquart) include those forms the pupae of which mostly dwell in the water, respiring by means of external tubes or filaments situated in front of the body. They have also the power of swimming, and are usually remarkable for their cleanly, beautifully objects for the microscope. The larvae of Chironomus plumosus are vermiciform, and of a blood-red colour, whence they are called Blood-Worms. [Chironomidae]

The Gallihoes (Oecidomyiides) include those species which form galls by depositing their eggs upon plants.

The Fungivores (Myagrophilous, Maquart) embrace an immense tribe of insects, of which some are uncapable of leaping by means of their hind legs. They are found in damp situations amongst various plants. They enter houses, and are found upon window-panes. They are also very partial to fungi, hence their name; and they are generally found in the vicinity of Botany and Pomology.

The Terriroides (Tipulides, Maquart) are the true Crane-Flies. The species of the genus Tipula are found in damp meadows in great numbers, especially in the autumn. The larva are white, with a blue spot on the back, &c., and occasionally do much harm. Mr. Westwood remarks that the male Daddy-Long-Legs is very quarrelsome, and often fights with his brethren of the same species.

The Florales (Bibionides, Maquart) are distinguished by having the body and legs shorter and more robust than the other forms. The species are small and their flight is slow and heavy. (Vide "Families of Insects," by TdcmorD.)
his poems had 10,000 subscribers; not long afterwards his fellow townsmen proposed to erect his bust in a public place, and it was only the reluctance of Tollens himself which prevented the intention from being carried out, when the subscription was already full. This popularity increased as he grew more advanced in life. On his seventieth birthday, the 24th of September 1850, the minister of justice, Mr. Nedermeijer van Rosenthal, waited on him at his house at The Hague, and was shown round the King of Holland, and present to him the insignia of commander of the order of the Dutch Lion, a very unusual honour for a literary man. A committee was then submitted to him the same day to offer him the Dutch order of the Lion of the Sea, as "Nederland zijnen geëerde Volksdichter" (Netherlands to its beloved national poet), and to inform him that a subscription had been organised, without his knowledge, for the formation of a "Tollens Fund," to commemorate his name by a charitable institution, the nature of which was to be left to his own choice. He died in 1856, surrounded by universal respect.

The shorter poems of Tollens, lyrical and narrative, are his chief title to remembrance. One narrative poem, De Overwintering der Hollander op Nova Zembla (The Wintering of the Hollander at Nova Zembla), commemorative of the celebrated voyage of Barends in 1695-97, is very popular and has often been reprinted, on one occasion in an illustrated edition. The poem is commemorated by the Dutch Days' Sea-Fight, commemorative of one of the desperate contests between the Dutch and English in the reign of Charles II., may be compared for spirit to his friend Loots's "Overwinning bij Chatham" (Victory at Chatham), a far more recent work. December of the same year contains a fierce ballad of ballads on subjects of Dutch history, among which his "Jan van Schaffelaar," "Keesau Hasselaar," &c., are conspicuous. His "Wapenkreet" (Call to Arms), written on occasion of Napoleon's return from Elba, is one of his best productions. The poem was translated from the German and English as well as the French, but often adapted the pieces he borrowed to Dutch subjects or history. An English reader would hardly suspect before reading it that the work was in any way connected with events which must be regarded as "Young Loochin," which has also been done into Dutch by Van Lennep, under the title of De Heer van Culemborg. Tollens's works, of which a new edition is now published, are of some extent: his shorter poems alone occupy about ten 8vo. volumes, not very closely printed.

TOLUOLE. [CHEMISTRY, 2.] TOUKE, THOMAS, one of the two sons of the Rev. William Touke, who was born in 1773. He published in 1838 A History of Prices and Prices of Production, and in 1837-1838, by a brief sketch of the State of the Corn-Trade in the last two Centuries, 2 vols. 8vo. The treatise comprised in these two volumes, though apparently an enlargement and continuation of one published about thirty years earlier, was found to be defective and unsatisfactory. Details on the High and Low Prices of the last Thirty Years, embarking, as it does, the same line of argument and establishing the same conclusions, is yet essentially different both in its arrangement and details, and is, in fact, with slight exceptions, entirely new. It forms the first two volumes of the valuable work now well known to political economists as the "History of Prices," perhaps the first really scientific attempt to elucidate by inferences legitimated by actual experience the complicated facts of this branch of political economy. The first two volumes were followed in 1840 by another volume in continuation of the two former, to which were added Remarks on the Corn Laws and on some of the Alterations proposed in our Banking System. The fourth volume was entitled A History of Prices and the State of the Circulation from 1839 to 1847 inclusive; with a General Review of the Currency Question, and Remarks on the Operation of the Act 7 & 8 Vict., c. 52., 8vo. 1849. Mr. Touke's works published in London in 1844 were: On the Bank-Charter of 1844, its Principles and Operation, with Suggestions for an Improved Administration of the Bank of England, 8vo. The last two volumes of his great work, the completion of a very valuable history of the State of the Circulation during the Nine Years 1848-1856, in Two Volumes, forming the Fifth and Sixth Volumes of the History of Prices from 1839 to the Present Time, by Thomas Touke, F.R.S., Corresponding Member of the Institute of France, and William Newmarch, 8vo. 1847. The 6th and 8th volumes, besides containing a continuation and completion of the work, arranged under the heads Prices of Corn, Prices of Produce other than Corn, and the State of the Circulation contains discussions on the connected topics of Railways and the Railway System, the origin and progress of the Free-Trade Movement, the State of Finance and Banking in France, and the New Discoveries of Gold. Mr. Touke died in London, Feb. 26, 1856, being then within a few days of his 79th year. His younger brother, William Touke, F.R.S., is still living.
The amnesty of 1823 restored him to Spain, but he was not permitted to reside in Madrid till after the death of King Ferdinand. In 1834, on the promulgation of the 'Estatuto Real,' by Queen Christina, on the recommendation of his friend, Martinez de la Rosa, he was named minister of finance. The measures he proposed for the state's economic growth, he said, were harmonious and could be carried out successfully for some time, and prevented his sharing the unpopularity of the chief, so that, when in 1835 Martinez de la Rosa was compelled to retire, Torero succeeded to his post as a strong support of the national council. Unfortunately for himself he admitted to his own post of minister of finance Mendizabal, who, with his dazzling schemes, soon threw him into the shade. Torero, who was now decidedly a 'Moderado,' grew more and more convinced that in Barcelona for the nation's welfare, a great body should be conformed to the constitution, the Barcelonan franchise, which he wished to repress by forceful means, but his colleague thwarted him, and the country was not with him. In September 1835 he was driven to resign, and Mendizabal succeeded as head of the cabinet. On a dissolution of the Cortes, Mendizabal was returned by the electors of other different places, and Torero and Martinez de la Rosa were left without a seat. The disgraceful revolution of La Granja followed, the constitution of 1812 was proclaimed, and Torero, now in great despair, it is reported, it expected to resume his historical studies in Paris and London, where he brought his history to a conclusion, at the time that in Madrid he was sentenced to forfeit all his honours and estates. In a few months, however, he was again allowed to reside in Madrid. In the subsequent years he vindicated his character against an accusation of corruption brought against him by General Secano. The revolution of Barcelona drove him to banishment yet another time. In 1841 it was the last. Torero, after a tour in Germany and Italy, went to Paris, and, on his return, it is said to Spain, when seized with a cerebral disease, which carried him off in a few days. He died at Paris on the 15th of September, 1845; but his remains were conveyed to his own city, and the church in Madrid, at Madrid, on August 19, 1846.

Torero's 'History of the Insurrection, War, and Revolution of Spain' ('Historia del Levantamiento, Guerra, y Revolucion de Espana'), is the great Spanish work on that interesting subject. That it is a model of Spanish composition is affirmed by the host critics of that country. Its merits as a narrative are more liable to question, for there appears a languor and general want of spirit in its details, which surprise the reader who is aware that its author was not only an eye-witness of many of the events he describes, but also an actor in some of them. The editor of the edition of 1849, published after the author's death, speaks of the 'carefulness and precision of the history, in which,' he remarks, 'the most insignificant French detachment is noted by him, specifying the names of the chief who commanded it.' A merit of more importance which Torero's history possesses is that of a calm judicial tone, which favourably contrasts with the arrogant impetuosity of the history of the same memorable conflict. On the whole, it can only be considered like Southey's 'History of the Peninsula War,' as a temporary substitute and a collection of materials for the great work on the subject, with which it may be hoped that some future historian will enrich the literature of his country. The 'Historia del Levantamiento' has been translated into French and German, and a Spanish edition of it was printed by Baudry of Paris in his collection of the Spanish classics. The history consists of fifteen large quarto volumes at Madrid in 1849, which is the author's death, with his additions and corrections.

TORQUAY, Devonshire, a small sea-port and watering-place on the coast of the English Channel, in the parish of Tor-Moham, or Tor-Michael of Haytor, is situated in 50° 28' N. lat., 3° 33' W. long., about 30 miles S. from Exeter, 194 miles W.S.W. from London by road, and 219 miles by the Great Western and South Devon railways. The population of the town of Torquay in 1821 was 2,805; in 1851, 4,005. It is the residence in the archdeaconry of Totnes and diocese of Exeter.

About fifty years ago Torquay consisted only of a few moon huts inhabited by fishermen. The mildness of the climate, and the favourable position and picturesque character of Torquay, induced many doctors and physicians to recommend it as a winter residence for invalids. The abundance of building stone, which is found in the vicinity, presents great facilities for building. The town has consequently very much increased. Torquay lies in a small sheltered recess at the north-eastern extremity of Torbay. On all sides landward it is inclosed by lofty hills, on the sides of which the houses are built. The town is lighted with gas and paved, but the supply of water is insufficient.

The pier, which is used also as a promenade, incloses a small but convenient tidal-harbours. The rise of tide at spring-tides is about 18 feet. The imports consist chiefly of American timber, coal and culm, Portland stone, corn, bricks, slates, and general goods: the exports include emery, eggs, mineral waters, and admixtures, which are exported to America.

TRACHEARIA, a subdivision of the great class Arachnida. It includes those forms of this class which carry off their respiration by means of ramifying tracheal tubes. They have two or four eyes. This division includes the walking forms of Mites, Ticks, Shepherd-Spiders, and Bes-Spiders. The following is a synopsis of the families of the sub-class from the 'Manual of Natural History,' by Means Adams, Balkie, and Barron:—

Order I.—Mononomosomatida.

Body without division, the head, trunk, and abdomen being united into a single mass; abdomen not annulated.

Sub-Order I.—Erranti.

Mouth with distinct mandibles; palpi always present; animal eye.

Family 1. Acaridae.—This includes the True Mites [Acaridae].

Family 2. Trombidae, Garden-Mites.—Palpi jointed, with a moveable appendage below the tip; feet formed for walking; facio-lateral-anterior; chelicere ending in a moveable claw.

Trombidium holosericeum is of a blood-red colour, and is very common in gardens during the spring.

Family 3. Gnapsidae, Spider-Mites.—Palpi filiform, in- curved; mouth with two discriminately chelicer; body depressed; skin soft or scaly; legs formed for walking; tarsi ungualicate. The Red Spider of our hothouses belongs to this family.

Family 4. Bexelidae, Wood-Mites.—Palpi fusiform, under the head, without hooks; mouth with discriminately chelicer; eyes not distinct; body hairy or scaly, produced and rostrate in front; legs formed for walking.

Sub-Order II.—Suctoria.

Mouth in form of a sucker, with or without palpi; as apparent mandibles; animal attached.

Family 5. Isopoda, Book-Scoops.—Palpi antenniform; mandibles ungualicate or cheliform; eyes distinct; sucker in form of an elongated bead; body with a escape; legs formed for walking.

Family 6. Hydrochidae, Water-Ticks.—Palpi with the last joint armed with points, the third and fourth joints larger than the others; body simple, oval, or rounded; eyes supero-anterior; legs elongated, formed for swimming; parasitic in the young state; aquatic.

The species are found in fresh waters. Hydrochaenus has the mouth composed of plates forming a projecting sucker.

Family 8. Lepidida, Harvest-Ticks.—Palpi short; sucker corredor; body depressed, corconvate, oval or rotundately; legs six, two being undeveloped.

Lentus antarcticus is very common in autumn up grass and other herbage. They crawl upon the human body, and insinuate themselves into the skin, producing great irritation. They are called Harvest Bugs.

Order II. Adelarthronosomatida.

Body divided into three or four distinct segments; abdomen distinct, annulated; mouth with complete oesophageal appendages, both terminal.

Family 1. Soljugidae, False Scorpions.—Mandibles in the form of large compressed claws, with a moveable finger palp large, in the form of, or of cheliferous arms, both being membraneous; oesophageal appendages carunculate.

Family 2. Cheliferae, Book-Scoops.—Mandibles short; didactyle at the end; palpi very large, annulated, with a pincer at the end; body ovate, depressed, narrow.
in front; legs of equal size, short, ending in two books.

Chelifer cancriformis is found in herbariums, old books, etc., where it feeds upon the minute insects which frequent such situations.

Family 3. Phalangiidae, Shepherd-Spiders.—Mandibles very conspicuous, composed of two or three pieces, free, ending in a didactyl pincer; palpil filiform, ending in a hook; body short, rounded; abdomen segmented; legs elongated; family comprises the well-known forms called Harvest-Men.

Sub-Class III. Aproschniata.

This sub-class includes the genera Nymphon and Pseu disclosures, which are the types of orders of Nymphonida, Phalangites, the Sea-Spiders, and Pseu disclosures, Parasitio Sea-Spiders. These are often referred to the class Crustacea.

TRACHYPHONUS. [Woodpockers.]

TRACHYPHONES, a genus of fishies belonging to the ribbon-shaped forms of Acanthoderigii. The body is elongated and compressed; dorsal fin extending the whole length of the back, a few of the anterior rays sometimes elongated; ventral fins fragile, if not worn or broken, rather long; no anal fin; caudal fin-rays rising almost vertically from the horizontal line of the vertebral column; a row of small spines along the lateral line.

T. Bogmarus, the Vaalnagel, or Deal Fish, is described by Dr. Fleming in the ‘Magazine of Natural History.’ He was the first British naturalist who has made known its occurrence in Scotland. The species found in the north of Europe differ from those of the Mediterranean. One specimen only has been recently caught alive at Sands in Urkney. It is thus described.—Length, three feet; body elongated, tapering, and considerably compressed, where it does not exceed a table-knife in thickness; breadth nearly five inches, tapering to the tail; colour silvery, with minute scales, the dorsal fin of an orange colour, and the iridescent greenish-blue with a golden shelf at the sides, the rays of unequal size; head four inches and a half long, compressed like the body, with a groove on the top; eyes one inch and a quarter in diameter: both jaws armed with small teeth. Various specimens, probably to the number of twelve or more, appear to have been obtained on the island of Sanda between 1817 and 1829. The Vaalnagel is rare in Iceland. It differs from the two species found in the Mediterranean, T. futex and T. iris, and also from T. Leuctrella.

TRADE, BOARD OF. The functions of this branch of the Privy Council have been of late years considerably extended, its duties being some of them of a ministerial, and others of a judicial character. It has the general supervision of the regulations of the Board of Trade; the carrying into execution the statutes in force relating to them. For that purpose it has to require and receive various kinds of returns as to trade and navigation, and originate and consider reports made to it by its inspectors and the Board of Trade, and to examine the returns of the officers of the Board of Trade, and to examine the reports of the Board of Trade. It may lay down rules as to the conduct of examinations, and as to the qualification of applicants for the posts of masters and mates of foreign-going as well as of home-trade passenger-ships.

It grants licences to persons to engage in or supply seamen or apprentices for merchant ships in the United Kingdom, adjudicates on claims for wages, and investigates cases of alleged incompetence and misconduct (17 & 18 Vict. c. 104). The Board of Trade exercises a supervision over railways and railway companies, not only with respect to their original formation, but also as to their subsequent working. Railways were first placed under this control by the statute 3 & 4 Vict. c. 97. A few years afterwards the powers of the Board in this respect were transferred to a Board of Commissioners of Railways; but in 1851 all the powers of this latter body have been devolved upon the Board of Trade (16 & 15 Vict. c. 64). Notices of application for Railway Acts, accompanied by plans, must be deposited with the Board, before any bills can be introduced into Parliament, and before a line can be opened for traffic, notice must be given to the Board. A Railway Bill is introduced on the report of an inspector, appointed by the Board for those and other general purposes. So, when accidents occur, notice must be given to the Board, and an inspector is generally sent to inquire into the circumstances, and on his report the Board may cause alterations to be made for the greater safety of the public.

The Board of Trade, through the medium of its registrar, is also charged with the registration of all Joint-Stock Companies (19 & 20 Vict. c. 44). By the statute giving a copyright in designs, their registration is effected by the Registrar of the Board of Trade (5 & 6 Vict. c. 100; 6 & 7 Vict. c. 65; 13 & 14 Vict. c. 104; 14 & 15 Vict. c. 8; 15 & 16 Vict. c. 29). The navigator of a ship whose imported articles are not all in large towns are also not at once immediate, the appointments connected with them being made by the president. The Board also controls the proceedings of the Commissioners for regulating the employment of coal-trippers and wharfingers, and the day labourers engaged in the port of London (6 & 7 Vict. c. 65; 9 & 10 Vict. c. xxvi; 14 & 15 Vict. c. xxviii). Lastly, a department of the Board of Trade is charged with the election and publication of tables, containing information with respect to the revenue, trade, commerce, wealth, population, and other statistics of the United Kingdom and its dependencies, as well as of foreign countries. The officers of another department collect and prepare the tables of the various classes of which forms, &c., before the submission of the corn-laws, regulated the amount of duty, and still render the charge in lieu of tithe under the Tithe Commutation Act (Blackst. ‘Comm.’ Mr. Kerr’s ed. v. p. 288).

TRADE, SHIPPING, AND CURRENCY. In the article GARDNER, the two last years were marked by the official and declared value of the imports and exports, with the number of ships and amount of tonnage engaged in the trade of the country, down to the year 1836. The value of imported merchandise was only shown in the official values of the materials and goods of our commerce has been constantly increasing, but without going through the details of each year, we shall give only summaries of 1854, 1855, and 1856, for which the materials are afforded in the three volumes of commodities enumerated in the Board of Trade in a highly improved form; and for 1857, which is only a preliminary return, and somewhat less complete.

Trade. The real value of the total imports into the United Kingdom in 1854 was 152,802,035; in 1855 it was 165,342,854, and in 1856 it was 172,444,151. The values of our imports are computed from the average prices fixed for the articles, which are chiefly entered by quantities at the Custom House. The value of the exports is obtained from the declared values set on the articles, except in the case of the foreign and colonial produce, of which the price is computed in the same way as with the imports. In 1854 the total value of exports amounted to 116,821,092, of which 97,164,726L. were for the produce or manufacture of the United Kingdom; and in 1856 the total value was 124,136,018, of which 95,926,946L. were for the produce or manufacture of the foreign and colonial produce. In 1855 the total value was 116,661,300L. of which 95,688,056l. were for the produce or manufacture of the United Kingdom; and in 1856 the total value was increased to 128,220,353, of which 115,826,946L. were for the produce and manufacture of foreign and colonial produce. The three years show less discrepancy than they were at 124,106,018L., 117,354,881L., and 191,097,763L.

Our largest imports in 1856 were from the United States of America; they amounted to 36,047,735; from Russia they were 11,661,025L. from France, 10,365,522L. from China and Hong Kong, 5,421,648L. from Turkey, including the Principalities, Syria, Egypt, and Tripoli, 8,660,900L. from Holland, 7,833,442L. from the Hanse Towns, 5,302,739L. from Prussia, 4,634,184L. from Spain, 3,965,894L. from Belgium, 2,936,794L. from Spanish West Indies, 3,354,399L. from China, 2,201,831L. from Portugal, 1,649,090L. from Sweden, 2,031,861L. from various states of South America, Central America, and Mexico, 9,788,365L. from the Western Coast of Africa, 9,142,254L. from the United States of America, 1,667,375L. (this commerce has doubled itself within four years). From the Two Sicilies, 1,605,628L. from Greece, 1,627,289L. The imports from other countries are each under a million. The total of imports from foreign countries was 129,071,687L., and the amount of importation was from the East Indies, 17,262,851L. the other principal amounts were,—the North American Colonies, including Newfoundland, 6,583,770L. the Australian Colonies, including New Zealand, 5,736,043L.
the West Indies, 4,167,084.; Mauritius, 4,247,067.; Cape of Good Hope, 1,502,828.; British Guiana, 1,418,349.; Cape Colony, 3,792,964.; and other colonies, 14,002,833. The exports from British possessions of the value of 43,026,561.

Of the exports, the total value taken by foreign countries in 1856, was 8,252,069. and by British possessions, 33,300,498. The United States (including Cuba, including the produce shipped from the Venezuela) took, in value, 21,918,105.; followed by the Hanse Towns, 10,134,813.; Turkey, including Syria and Egypt, 6,504,499.; France, 6,432,650.; Holland, 5,723,253.; Brazil, 4,084,537.; Spain, 1,714,483.; Belgium, 1,663,574.; Austria, 1,455,741.; China (exclusive of Hong Kong), 1,416,475.; Chili, 1,301,451.; Cuba, 1,317,062.; Two Sicilies, 1,202,183.; Sardinia, 1,143,684.; Sweden and Norway, 1,118,661.; Denmark (including Holstein, &c.), 1,084,140.; Portugal, 645,738.; and Russia, 298,957.; amounting together to less than a million sterling, and placed above a million. Of the British possessions receiving exports, the largest amount was by the East Indies (including Ceylon and Singapore), 11,607,439.; Australia (including New Zealand), 10,713,290.; North American Colonies (including Newfoundland), 4,010,282.; British West Indies (including Guiana), 1,873,397.; Cape of Good Hope and South Africa, 1,344,338.; these are the only places that exceed a million, but Gibraltar takes to the amount of 800,000.

The principal articles imported were—livestock (including horses) to the value of 1,488,691.; bacon and hams, 1,078,984.; butter, 2,353,182.; cheese, 1,094,260.; clocks and watches, 392,273.; coffee, 1,498,106.; copper and lead, 2,953,063.; honey, 1,814,303.; meal, 23,035,622.; cotton, raw and manufactured, 27,112,224.; flax and tow, 3,633,194.; fruit, including almonds, raisins, currents, &c., and oranges, spices, &c., 2,602,420.; guano, 2,136,431.; hemp, 1,694,578.; hides, 2,814,743.; indigo, 2,453,633.; olive-oil, 1,124,755.; palm-oil, 1,691,407.; salt and spermaceti-oil, 1,165,410.; oil-seed cake, 716,014.; rice, 2,031,647.; flax and linen, 3,196,654.; silk, raw and manufactured, 11,467,686.; almonds, 2,638,686.; spices, &c., 2,287,756.; wood, 2,000,000.; and many other kinds.

The rates declared were at New York, 20,816 vessels, 3,911,923 tons, in the year 1856, and 2,247,761 tons, in 1855.

Shipment.—In the year 1855 there were 22,871 British ships entered inwards, of which the burthen was 5,232,286 tons; in 1856 the number entered was 28,029, with a burthen of 6,390,710 tons, an increase in the year of 321 ships, and of 1,119,923 tons. In 1855 the number of foreign ships entered was 18,193, tonnage 3,880,641.; in 1856 the number of ships was 18,571, tonnage 4,162,029.; an increase in the year of only 28 ships, and of 281,388 tons; considerably less than a half of the British increase. Of the total amounts also in 1856 there were 7788 British ships with a tonnage of 1,304,453 entered in ballast; and 54 of the foreign ships, with a tonnage of 1,238,458.; an increase of only 6, of the tonnage 29,068. In 1855 the British ships cleared outwards with cargoes, of 5,036,926 tons burthen, and 2279 ships, of 612,014 tons burthen in ballast; in 1856 the numbers were 23,970 ships, of 5,885,681 tons burthen with cargoes, at 2,915 ships, of 671,185 tons burthen in ballast. The foreign vessels cleared out in 1855 were 16,167 ships, of 3,315,983 tons, with cargoes, and 3335 ships, of 577,553 tons burthen in ballast; and in 1856 there were 17,383 ships, of 777,447 tons burthen with cargoes, and 3361 ships, of 708,931 tons in ballast. The correspondence in the increase of the British trade is in its reports, notwithstanding the greater facilities offered by foreigners to the reuse of the original navigation laws. The returns include both steam and sailing vessels. Of the foreign vessels with cargoes, the greatest number in 1856 was from Norway, 2229 ships, of 488,744 tons burthen; the next highest number was from Denmark, 2053 ships, but of only 194,686 tons burthen, or less than 200,000. The British ships entered inwards in 1855 was 1210, the united tonnage being only 465,462; the size of the ships being suited to the low shores of Holland and the shallows of the North Sea: but, crossing the Atlantic, the United States received in 1856, 1439 ships, of 1,375,631, approximating to a thousand tons for each vessel. The burthen of the whole number of 15,231 British ships was 5,896,282 tons, an average of very nearly 280 tons each. The total number of registered British vessels, sailing and steam, was 36,012, of which the tonnage was 5,312,436, and the crews numbered 267,373 men, but this included the Channel Islands, and colonial possessions. In the British islands there were 6471 sailing vessels not exceeding 60 tons, and 12,027 above 60, and 329 steam vessels not exceeding 50 tons, and 743 above. In the Home Trade (which signifies the coasts of the United Kingdom, or to ports between the limits of the river Dee and the Firth of Forth, but does not include river steamers and river traffic), the burthen of vessels of 50, 60, and 74 tons burthen, with 33,570 men, and 317 steam vessels, at 67,616 tons burthen, and 4786 men. Partially in the Bay and partly in the Foreign Trade there were employed 595 sailing vessels, of 168,468 tons burthen, and 1583 men, and 226,969 tons burthen, and 965 men. In the Foreign Trade there were employed 3050 sailing vessels, of 2,942,674 tons burthen, and 110,716 men; 492 steam vessels, of 247,337 tons burthen, and 1178 men; and 2342 vessels, of 180,810 tons burthen, and 2475 men, entered in the United Kingdom, of which 921 were sailing vessels and of these 33 were of iron, of an aggregate tonnage of 187,000; and 229 steam vessels, of which 175 were of iron and with an aggregate tonnage of 67,573. In the Channel Islands, the value of vessels built and registered, of which the tonnage was 17,586, and there were 67 foreign-built vessels, tonnage 11,841.
registered at various parts of the United Kingdom. There were also 69 steamers and 6 sailing vessels built during the year for foreigners, the tonnage of which amounted to 34,601. There were 749 vessels wrecked during the year, 110 broken up, and 149 sold to foreigners, the tonnage of the whole, 249,459.

In the Coasting Trade in 1836 there were entered with cargoes (in ballast are omitted) 150,598 British vessels, 36,537 silver, 15,248,329, and 370 foreign vessels, tonnage 65,535. For the United Kingdom there entered 127,735 sailing vessels, and 24,752 coasting vessels, tonnage 24,735 steamers. The foreign sailing vessels entered numbered 288, the steamers 19; the number cleared was 315 sailing vessels, and 29 steamers.

In 1837 the notes of the Bank of England, including sailing vessels, and steamers, entered inwards with cargoes, was 19,691, the tonnage 6,418,090; the foreign vessels, 13,602, tonnage 3,314,090. Cleared outwards, there were 24,854 British vessels, tonnage 6,204,198; the foreign vessels 15,570, of which 6,506,292, The number of ships in ballast is not stated. Of the ships entered inwards Norway and Denmark still have the greatest number, Norway 2086, and Denmark 2311, while the United States sent only 1250 ships, nearly 200 less than in 1836, and the tonnage was 11,414,552. France sent 972 ships, 34,411,032 tons, although France only entered inwards 1122 ships, tonnage 90,038, she cleared out 4410 vessels, tonnage 473,859; Denmark cleared out 3141 ships, tonnage 316,625; Norway 1696 ships, tonnage 145,032; and the United States, 1295 vessels, tonnage 295,594. The number of ships employed in the Coasting Trade was 129,401 entered inwards, tonnage 12,979,068, of which 316 were foreign vessels, tonnage 48,619; cleared outwards, 144,355 vessels, tonnage 14,096,201, of which 321 were foreign vessels, tonnage 70,091.

Currency. At Michaelmas, 1837, the amount of Bank of England notes and post bills in circulation, was 17,086,610l.; the value of coin and bullion in hand was 3,826,000l. On October 17. At Michaelmas, 1837, the total amount of notes, other than Joint Stock Banks and Joint Stock Banks and Bank of England was 10,142,049l.; of which 3,701,996l. were of those Private Banks, and 3,440,653l. those of Joint Stock Banks. In the year gold to the value of 1,253,684l.. silver to that of 76,111l. and copper to that of 506,201l. The number of ships employed in the Coasting Trade was 129,401 entered inwards, tonnage 12,979,068, of which 316 were foreign vessels, tonnage 48,619; cleared outwards, 144,355 vessels, tonnage 14,096,201, of which 321 were foreign vessels, tonnage 70,091.

The value of gold and silver bullion exported in 1837 was 35,563,986l.; of which 15,061,600l. was in gold, and 15,505,384l. in silver. Of the gross sum 10,563,816l. in gold was struck into, and 1,035,328l. transferred to Egypt in transit to India and China. To no other country was so much as a million sent in both metals, except Brazil, to which was forwarded 938,014l. in gold, and 54,901l. in silver, a total of 1,012,913l. The Hansa Towns received 19,006l., and the Russian 7,465l. in silver; and the United States, 959,110l., all but 15,980l. in gold.

TRANSPORTATION [Savittude, Penal, &c.] TRAVNICK. [Botan.] TREE-FERN. [Cyathea, &c.] TRIELENODON. [Squalid.] TRIAKIS. [Squalid.] TRIGLOCHIS. [Squalid.] TRILLIUM. [Savittude.] The species are all native of warm climates, and yield the Rose-Wood of commerce.

TRITHEN, FREDERICK HENRY, a distinguished Sanoriit and Siavono scholar, was born in February 1820 in Switzerland when he was five years old. He removed to a few years old to Odessa, his father having accepted the situation of professor at a Russian college in that city. At Odessa he received an excellent education and had ample opportunities for making himself acquainted with the
modern languages, of which French, English, and German were as familiar to him as Russian. At the university of Edinburgh he pursued his studies more in the field of doctor of philosophy, he was distinguished for his knowledge of Greek, and he studied Sanscrit under Bopp. After passing some time in Poland, where he made himself master of Polish, he came to England, where, in 1841, he was set to work for a while as a translator. Dr. Tait, the present bishop of London. He then began to contribute articles, chiefly on subjects connected with Sanscrit literature, to the 'Penny Cyclopaedia' and the 'Bibliotheca Indica' of the Society for the Diffusion of Useful Knowledge.

In 1844 he was appointed one of the assistants in the Printed Book department in the British Museum, and was partly employed in cataloguing the Sanscrit and Arabic works. He added to the large stock which had then recently been added to the Museum library. In coming to the Museum he had indulged in expectations that his talents and acquirements would probably attract the notice of the Trustees with the effect of bringing encouragement and promotion, and he was deeply disappointed to find that such expectations were unfounded. He accepted in 1845 the post of private tutor in the family of Prince Chernichev, the Russian minister of war, and afterwards in 1846, Peterkin, left England after an absence of about two years, part of which he had spent at Constantinople and Cairo, and in 1848 published in London an edition of the 'Maha Vira Charita,' or History of Rama, a Sanscrit drama, by Bhavabhuti. He entered the service of the Trustees as the professor for the professorship of modern European languages in the Taylor Institution at Oxford, which was then on the point of being set in action. The professor, it was decided, was to be appointed at first for five years only, but with the capability of being re-elected; his post was to be one of influence and authority, the rest of the officials of the institution being placed under his directions, and his salary was to be 40l. a year. Dr. Trithen was elected to this post, and he agreed to come to Oxford and contrary to his own expectations, and entered upon his duties with a lecture "On the position occupied by the Slavonic dialects among the other languages of the Indo-European family," which he afterwards printed as an essay in the 'Proceedings of the Philosophical Society of London,' of which he had been a member since 1843. The career of usefulness and honour which now seemed to lie before him was suddenly cut short about the middle of 1850 by an accident which brought death. He was a masterly scholar, and his friends found it necessary to put him under restraint. It was reported at the time that the immediate cause of the disorder was, that a lady to whom he had paid his addresses had married a rival, but a tinge of eccentricity had on some previous occasions rendered him remarkable. His father came to England, and in 1851 removed him to Odesa, where he remained in a hopeless state till April 1854, when the city was under apprehensions of bombardment from the English. Trithen was then removed to a village at a few miles distance, where an unexpected change in his disorder took place, and he recovered his mental powers as suddenly as he had lost them, but this was only a lightening before death." After expressing a strong desire to return to England, it became evident that his bodily strength was failing, and he expired on the 27th of April 1854. He left behind him no adequate monument of the extent of the powers which his friends knew him to possess, his name is to be found in the biographical literature in the Cyclopaedia and Dictionary of National Biography, and so is his character, and his scholarship was not only accurate but remarkably. The power which he possessed of conversing with ease in more than one of the Teutonic, the Romance, and Slavonic languages, which qualified him in an eminent degree for the professorship to which he was chosen.

TRUDERGEB, Tailorworts, a small natural order of Polycarpia belonging to Lindley's class Dicyogamae. They have the dityogenetic stamens, unisexual, compound, and numerous 1-seeded carpels. There are only two genera, Trityrus and Peltophyllum. The species of these plants were discovered by Mr. Miers and Mr. Gardner in the woods of the Island of Madagascar in the right place of the sea. Their relations are with Sinilla, Menispermacae, and Trillaeae. TRUCTITE. [MINERALOGY, s. 1.]

TROWBRIDGE. [Wiltsnter.]

TRUMFET-FISH. [Ctenarchus.]

TRURO, THOMAS WILDE, FIRST LORD, the son of a respectable solicitor in Warwick-square, London, and Saffron Walden, Essex, was born in 1782, and received his early education at his father's solicitor's in Warwick-square. He was articled as his father's clerk and was later made an attorney in 1806, practised for some years as partner in the firm of Wilde and Knight, in Castle-street, Falcon-square. In 1817 he was called to the bar, and went the Western Circuit, and attended the House of Commons, in which he carved himself as an advocate, and became leader of his circuit. In 1824 he was made a serjeant-at-law, and three years later a king's serjeant, and a vast ascension of business was the consequence. Under Lords Denman and Brodie, who were the leading advocates of the time, he was accustomed to use the House of Commons, where he was probably the most popular member, and certainly the most respected. He was one of the most able advocates of the time, and was constantly in the court of appeal. His practice was very extensive, both at the bar and in the House of Commons, and he was frequently called upon to engage in the defence of the late Duke of Newcastle, and though thrown out in December 1832, he regained his seat in January 1833, and retained it, as colleague with Mr. W. E. Gladstone, until 1841, when he was elected for Worcester. In 1839 he succeeded Sir R. M. Bole, now Lord Crossworth, as attorney-general of the Duchy of Lancaster, and was returned for Newmarket in 1846, and was re-elected in 1841. In 1846, on the return of the Liberal party to power under Lord John Russell, Sir Thomas Wilde was again nominated attorney-general, but within a week afterwards was raised to the bench as chief-justice of the Common Pleas. He returned for the second time in 1850 the great seal, and was at the same time elevated to the peerage as Lord Truro. He resigned the chancellorship on the retirement of his party from office in February 1852. The most memorable causes in which he was professionally engaged before his elevation to the judicial bench were the trial of Queen Caroline, alluded to above, and the trial of the late Mr. O'Connell in 1844, to whom he gave his services without fee or retainers to obtain a reversal of the decision of the law courts and of the COMPANIES by which he was permanently connected with the great oase of Stockdale v. Hansard, which involved the constitutional question as to whether the House of Commons had the right of publishing its reports without rendering its officers thereby liable to before his elevation to the judicial bench were the trial of Queen Caroline, alluded to above, and the trial of the late Mr. O'Connell in 1844, to whom he gave his services without fee or retainers to obtain a reversal of the decision of the law courts and of the COMPANIES by which he was permanently connected with the great oase of Stockdale v. Hansard, which involved the constitutional question as to whether the House of Commons had the right of publishing its reports without rendering its officers thereby liable to...
legal decisions were too frequently based, and to insure that they shall henceforth be given according to their own respective merits, "according to the very right and justice of each case," as more fully explained in Finch's "Summary of the Common Law Procedure Act," 1834.

Lord Turvo was twice married: his second wife, who survives him, was Mademoiselle Augusta Émide d'Este, daughter of H.H. the late Duke of Sussex. He died at his residence of Lord Holland's, on the 11th of November 1855, and was buried by the side of the late Sir Augustus d'Este, in the Old Minster Church at Ramsgate.

TRUSTEES. Owing to the inadequacy of the existing law to meet the case of the defalcations and frauds of trustees, bankers, or others, it becomes important to arrange with the care and management of the property of others, a statute was passed in 1857 (20 & 21 Vict. c. 54) whereby the following offences were made a misdemeanour punishable with penal servitude for three years, or imprisonment, not exceeding two years, with or without hard labour:—

1. The appropriation or disposal, with intent to defraud, by a trustee of any property held for the benefit of some other person, or for any public or charitable purpose.

2. A banker, merchant, broker, attorney, or agent, selling, pledging, or in any manner appropriating, with intent to defraud, the property of any other person entrusted to him for safe custody.

3. Any person entrusted with a power of attorney for the sale or transfer of any property, fraudulently selling or transferring it.

4. A director, member, or public officer of any body corporate or public company, fraudulently taking or applying, for his own use, any money or property belonging to it, or any money or property belonging to it, or any money or property belonging to it, or any material omission in any book of account of any other document.

5. Any director, public officer, or manager of any body corporate or public company, receiving or possessing himself of any of its money or other property, otherwise than in payment of a just debt or demand, and with intent to defraud, or making or taking any false entries or transferring it, or any other person in trust for the public, or for the use of any charity, any money or property belonging to it, or any money or property belonging to it, or any material omission in any book of account of any other document.

6. Any director, manager, public officer, or member of any body corporate or public company, or any person in trust, or making or taking any false entries or transferring it, or any other person in trust for the public, or for the use of any charity, any money or property belonging to it, or any money or property belonging to it, or any material omission in any book of account of any other document.

7. Any director, manager, or public officer of any body corporate or public company, who makes, circulates, or publishes, or concurs in making, circulating, or publishing any written statement or account which he knows to be false in any material particular, with intent to deceive or defraud any person, or the holder, or the owner, of any money or property belonging to it, or any money or property belonging to it, or any material omission in any book of account of any other document.

8. Any person knowingly receiving any chattel, money, or valuable security, which has been fraudulently disposed of, under any of the above provisions.

The statute further enacts that a bailee of any property fraudulently taking or converting it to his own use, or to the use of any other person than the owner thereof, although he shall not break will or otherwise determine the bailment, shall be guilty of larceny.

TRUSTS, CHARITABLE. The sovereign, as parens patriae, has the general superintendence of all charities: which he exercises by the keeper of his conscience, the Chancellor; and, therefore, whenever it is necessary, the Attorney-General files ex officio an information in the Court of Chancery to have the charity properly established.

Until the passing of Sir Samuel Romilly's Act, in 1812, this was the only ordinary mode of redressing a breach of trust by the trustees of a charity. Sir Samuel Romilly's Act introduced a more summary and efficient remedy for such breaches of trust. For this purpose any two or more persons were enabled, with the permission of the Attorney or Solicitor-General, or the Attorney-General in Camera, praying such relief as the nature of the law might require, to apply to the court, that such petition should be heard in a summary way upon affidavit, or such other evidence as should be produced, the order thus made to be final, unless appealed against to the House of Lords within two years. This Act led to the appointment of Commissioners, who were to report upon cases of neglect, abuse, or breach of trust; and the reports of this body, which now extend to 38 volumes, form a valuable collection of information upon the subject of existing charities. Additional powers were given by the Acts 3 & 4 Vict. c. 77 to the Court of Chancery with respect to grammar schools, but the latest and most important piece of legislation on this subject is the "Charitable Trusts Act," 1876, passed to secure the due administration of charitable trusts, and in certain cases a more beneficial application of charitable funds than that previously in operation. For these purposes a permanent board of commissioners is constituted, called "The Charity Commissioners for England and Wales." It has power to inquire into all or any charities, their nature, objects, and administration, and the condition of the estates and funds belonging to them. This board is empowered to require all trustees of charities to render in writing to the board or its inspectors, accounts, explanations, and answers, to any inquiries, and to produce any documents in their custody.

When the income of any charity exceeds 30l., and in the case of a London charity even when the income is below 30l., the Master of the Rolls and the Vice-Chancellors are to entertain any suit which may be brought for its administration. In the administration of charities where the income does not exceed 30l., jurisdiction is given to the county court or the court of bankruptcy of the district where the charity is situated. The district court or the court of bankruptcy or county court may, however, be brought by the commissioners before a judge of the Court of Chancery, for reconsideration. [COURT OF COUNTIES, S. 2.] Application to be made by the Attorney-General, by any one or more of the trustees or managers of the charity, by any one interested in it, or by any two or more inhabitants of the place where it is administered; and as the courts are prohibited from entertaining any legal proceedings (except with the concurrence of the Attorney-General) unless upon the certificate of the board, the first proceeding is, in almost all cases, to communicate with that body and obtain its sanction and advice. The powers of the Attorney-General in which it performs the function of extracting information on the subject of charities, enable it to afford the most efficient assistance to individual informants. The statute does not extend to Scotland or Ireland; and from its operation are excepted the Universities of Oxford and Cambridge, and certain other institutions. A report of the proceedings of the Commissioners must be annually laid before Parliament. [Blackst. 'Comm.,' Mr. Kerr's edition, v. iii., p. 483.]

TRYPHILINE. [MINERALOGY, S. 1.]

TURKEY. The profits of Turkey are divided into Eyalets or general governments, each administered by a pasha, who is generally styled Vali, or vice-reg. The Eyalets are divided into Livas, governed by Kaimakans, or lieutenant-governors. The Livas are subdivided into Cazas, or districts, and these again into Nahijes, or communes, containing villages and hamlets.

Turkey in Europe contains 15 Eyalets, divided into 43 Livas, and 376 Cazas. Turkey in Asia is divided into 18 Eyalets, 78 Livas, and 828 Cazas; Turkey in Africa into 3 Eyalets, 17 Livas, and 86 Cazas. The following table gives the names of the Eyalets, with the chief town of each, extracted from M. Uboin's recent work upon Turkey:—

**Turkey in Europe.**

<table>
<thead>
<tr>
<th>Eyalets</th>
<th>Capitols</th>
<th>Eyalets</th>
<th>Capitols</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edirne (Effi)</td>
<td>Adrianopolis</td>
<td>Kilkis</td>
<td>Adana</td>
</tr>
<tr>
<td>Boghlan</td>
<td>Silioula</td>
<td>Bagdat</td>
<td>Angora</td>
</tr>
<tr>
<td>Samsun</td>
<td>Samsun</td>
<td>Sivas</td>
<td>Sivas</td>
</tr>
<tr>
<td>Kastoria</td>
<td>Kastoria</td>
<td>Tekke</td>
<td>Tekke</td>
</tr>
<tr>
<td>Eginland</td>
<td>Eginland</td>
<td>Isnik</td>
<td>Isnik</td>
</tr>
<tr>
<td>Resel</td>
<td>Resel</td>
<td>Trabzon</td>
<td>Trabzon</td>
</tr>
<tr>
<td>Marash</td>
<td>Marash</td>
<td>Van</td>
<td>Van</td>
</tr>
<tr>
<td>Erzurum</td>
<td>Erzurum</td>
<td>Gumushane</td>
<td>Gumushane</td>
</tr>
<tr>
<td>Kharper</td>
<td>Kharper</td>
<td>Erzurum</td>
<td>Erzurum</td>
</tr>
<tr>
<td>Vaghelrose</td>
<td>Vaghelrose</td>
<td>Erzurum</td>
<td>Erzurum</td>
</tr>
<tr>
<td>Hidiva</td>
<td>Hidiva</td>
<td>Hacca</td>
<td>Hacca</td>
</tr>
<tr>
<td>Ararat</td>
<td>Ararat</td>
<td>Shavas</td>
<td>Shavas</td>
</tr>
<tr>
<td>Akhtamar</td>
<td>Akhtamar</td>
<td>Gatchin</td>
<td>Gatchin</td>
</tr>
<tr>
<td>Sanilor</td>
<td>Sanilor</td>
<td>Bogeda</td>
<td>Bogeda</td>
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<tr>
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<td>Bogeda</td>
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<tr>
<td>Jundos</td>
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<tr>
<td>Aydin</td>
<td>Aydin</td>
<td>Bogeda</td>
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</tbody>
</table>

**Turkey in Asia.**

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<thead>
<tr>
<th>Eyalets</th>
<th>Capitols</th>
<th>Eyalets</th>
<th>Capitols</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kastamoun</td>
<td>Kastamoun</td>
<td>Simyk</td>
<td>Simyk</td>
</tr>
<tr>
<td>Timour</td>
<td>Timour</td>
<td>Trabzon</td>
<td>Trabzon</td>
</tr>
<tr>
<td>Aydin</td>
<td>Aydin</td>
<td>Antipsam</td>
<td>Antipsam</td>
</tr>
<tr>
<td>Smyrna</td>
<td>Smyrna</td>
<td>Tana</td>
<td>Tana</td>
</tr>
</tbody>
</table>

**Turkey in Africa.**

<table>
<thead>
<tr>
<th>Eyalets</th>
<th>Capitols</th>
<th>Eyalets</th>
<th>Capitols</th>
</tr>
</thead>
<tbody>
<tr>
<td>Messin</td>
<td>Messin</td>
<td>Tarscopol</td>
<td>Tarscopol</td>
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<tr>
<td>Tarscopol (Tarsic)</td>
<td>Tarscopol (Tarsic)</td>
<td>Tarscopol (Tarsic)</td>
<td>Tarscopol (Tarsic)</td>
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<td>Tarscopol (Tarsic)</td>
<td>Tarscopol (Tarsic)</td>
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<tr>
<td>Tripoli</td>
<td>Tripoli</td>
<td>Tripoli</td>
<td>Tripoli</td>
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<tr>
<td>Tripoli</td>
<td>Tripoli</td>
<td>Tripoli</td>
<td>Tripoli</td>
</tr>
</tbody>
</table>
A general estimate of the population in 1844 made the inhabitants amount in round numbers to 35,550,000, distributed as follows among the great popular divisions of the empire:

**Turkey in Europe.**

<table>
<thead>
<tr>
<th>Race</th>
<th>In Europe</th>
<th>In Asia</th>
<th>In Africa</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Christian</td>
<td>2,100,000</td>
<td>1,000,000</td>
<td>1,000,000</td>
<td>4,100,000</td>
</tr>
<tr>
<td>Greek</td>
<td>1,000,000</td>
<td>500,000</td>
<td>500,000</td>
<td>2,000,000</td>
</tr>
<tr>
<td>Jew</td>
<td>100,000</td>
<td>50,000</td>
<td>50,000</td>
<td>200,000</td>
</tr>
<tr>
<td>Muslim</td>
<td>300,000</td>
<td>150,000</td>
<td>150,000</td>
<td>600,000</td>
</tr>
<tr>
<td>Total</td>
<td>3,500,000</td>
<td>1,650,000</td>
<td>1,650,000</td>
<td>6,800,000</td>
</tr>
</tbody>
</table>

The numbers of the different races of which the population is composed are given as follows:

**Religion.**

<table>
<thead>
<tr>
<th>Race</th>
<th>In Europe</th>
<th>In Asia</th>
<th>In Africa</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muslim</td>
<td>4,500,000</td>
<td>2,500,000</td>
<td>2,500,000</td>
<td>9,500,000</td>
</tr>
<tr>
<td>Greek</td>
<td>100,000</td>
<td>50,000</td>
<td>50,000</td>
<td>200,000</td>
</tr>
<tr>
<td>Catholic</td>
<td>600,000</td>
<td>300,000</td>
<td>300,000</td>
<td>1,200,000</td>
</tr>
<tr>
<td>Jew</td>
<td>100,000</td>
<td>50,000</td>
<td>50,000</td>
<td>200,000</td>
</tr>
<tr>
<td>Total</td>
<td>5,800,000</td>
<td>3,050,000</td>
<td>3,050,000</td>
<td>11,900,000</td>
</tr>
</tbody>
</table>

The total area of the Ottoman empire, including the tributary provinces, is estimated at 1,220,000 square miles, of which about 360,000 are in Europe, 560,000 in Asia, and 300,000 are in Africa.

With regard to the administrative division of the empire, it must be observed that neither the eyalets nor the sanjaks, or livas, have such invariable limits as provinces in Europe usually have; and with regard to the population, it is pleasant to dwell on the numerous improvements the Ottoman empire has undergone, but almost independent states of Servia, Moldavia, Wallachia, Egypt, Tripoli, and Tunis, the inhabitants subject to the Porte do not much exceed 20 millions.

Abdul-Medjid, son of Mahommed II., ascended the throne of Osman in 1839, in his 18th year. He immediately proceeded to Nezir, the treachery of the Cephan pashas, who deserted to Mehemet Ali with the whole of the Turkish fleet, and the advance of the victorious Ibrahim, seemed to foreshadow the immediate dissolution of the Turkish empire. This disaster was prevented however by the treaty of London (July 16, 1846), in fulfilment of which an Austro-English fleet bombarded and took Acre, Sion, and several other towns on the coast of Syria, which Ibrahim Pasha was obliged to evacuate. Negotiations for peace soon followed, which terminated in the restoration of the Porte to the coast, and the recognition of Mehemet Ali as hereditary pasha of Egypt and its dependencies, upon payment of an annual tribute.

The Swiss, who had revolted from their allegiance to the Osmanli Porte in 1830, were defeated by the Russians, and Varna, the last stronghold of the rebellion, was taken in 1841. Turkey was thus left in undisputed possession of the Black Sea and the islands of the Dardanelles, which had been ceded by a firman of 1769. The Turks were now, however, reduced to the defensive, and their power was sapped by internal dissensions and foreign attacks.

The numbers of the different races of which the population is composed are given as follows:

**Race.**

<table>
<thead>
<tr>
<th>Race</th>
<th>In Europe</th>
<th>In Asia</th>
<th>In Africa</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turk</td>
<td>1,000,000</td>
<td>500,000</td>
<td>500,000</td>
<td>2,000,000</td>
</tr>
<tr>
<td>Greek</td>
<td>100,000</td>
<td>50,000</td>
<td>50,000</td>
<td>200,000</td>
</tr>
<tr>
<td>Christian</td>
<td>600,000</td>
<td>300,000</td>
<td>300,000</td>
<td>1,200,000</td>
</tr>
<tr>
<td>Jew</td>
<td>100,000</td>
<td>50,000</td>
<td>50,000</td>
<td>200,000</td>
</tr>
<tr>
<td>Total</td>
<td>2,800,000</td>
<td>1,350,000</td>
<td>1,350,000</td>
<td>5,500,000</td>
</tr>
</tbody>
</table>

The numbers of the different races of which the population is composed are given as follows:

**Race.**

<table>
<thead>
<tr>
<th>Race</th>
<th>In Europe</th>
<th>In Asia</th>
<th>In Africa</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turk</td>
<td>1,200,000</td>
<td>600,000</td>
<td>600,000</td>
<td>2,400,000</td>
</tr>
<tr>
<td>Greek</td>
<td>100,000</td>
<td>50,000</td>
<td>50,000</td>
<td>200,000</td>
</tr>
<tr>
<td>Christian</td>
<td>600,000</td>
<td>300,000</td>
<td>300,000</td>
<td>1,200,000</td>
</tr>
<tr>
<td>Jew</td>
<td>100,000</td>
<td>50,000</td>
<td>50,000</td>
<td>200,000</td>
</tr>
<tr>
<td>Total</td>
<td>2,000,000</td>
<td>1,150,000</td>
<td>1,150,000</td>
<td>4,300,000</td>
</tr>
</tbody>
</table>
victories of Inkerman and Balaklava; and kept the eyes of the world fixed upon the spot where the whole interest of the war was now concentrated throughout the entire spring and summer of 1855, electric agency flashing to all parts of Europe tidings of losses and sufferings often, of defeats and successes, the reports of which, which was the victory of Tokharnya, August 16, in which the Sardinians, then numbered among the allies, fought with great skill and courage; until last, at last, a long bombardment, the French captured the Malakoff fortress on the 27th of July; all the同时 TURNER, JOSEPH MALLORD WILLIAM, was born at No. 26, Maidew-jane, Covent Garden, where his father carried on business as a hair dresser. The year, as well as the name of his family, was differentially given: all that is certainly known respecting either is entered on the register of the parish church of St. Paul's, Covent Garden, as having taken place on the 14th of May, 1775; and it is most probable that his baptism followed pretty close upon his birth. Of his boyhood and youth little is told. His father, a tradesman in a small way, did not attempt to make his son a scholar, and the great painter never advanced far beyond the rudiments of an ordinary English education. Of his primary training in art, or what little his father may have taught him by conference, we have no precise information. Probably his own strong inquisition first stimulated him to overcome the initial difficulties of the study of drawing, and some casual occurrence or association may have furthered his education. It does not appear that the elder Turner thwarted his son's bent, although, perhaps, from poverty, perhaps from indifferenced, he did not procure him the instruction which might have smoothed his early path.

Gilpin, the self-made painter. It is said in a brief notice of him published in 1805—when, though only in his thirtieth year, he was already recognised as the first of living landscape painters—"Turner may be considered as a striking instance of how much may be gained by industry, and how little, compared with the assistance of a master. The way he acquired his professional powers was by borrowing when he could a drawing or picture to copy; or by making a sketch of any one in the Exhibition early in the morning, and finishing it up at home. By such practices, and by much perseverance, he has overcome all the difficulties of the art."

(Dayes' "Professional Sketches of Modern Artists," Works, p. 352.)

This passage was written by one eminent in his day as an inimitable copy of what was then a fair imitation of his friend of Girtin, Turner's earliest and closest artistic associate, and it coincides with what other authorities, both written and traditioanary, have always related of his career. But he was certainly very young when he had opened to the academicians the gates of his rooms, and of his having been admitted as a student in the Royal Academy in 1789, when consequently he was only fourteen years old. It is hardly probable, however, that he received much direct instruction in the Academy school; but that he followed their prescribed course. If he studied in the antique, or later in the life-school, he certainly never acquired mastery over the human form, and no instruction was given the student in landscape drawing or painting. Still it is not likely that a young enthusiast, as he certainly was, would attend the schools and form acquaintance with professors and students, without acquiring from them much technical information, even if he received no systematic instruction. But his best education, he was accustomed to say, was "the first day with Dr. Malton," and as he was a warm-hearted patron of young artists, had an excellent collection of water-colour drawings and engravings at his residence in the Adelphi, and he not only gave his two favourite protegés, but also, free access to his treasures, with permission to copy them, but directed their studies, and encouraged them to make coloured sketches of the scenery around London, which he readily purchased at prices satisfactory to the modest students. In those sketch- ings, with their lithograph copies, which he showed them, and they formed for themselves a style of water-colour painting very different from that of any of their predecessors—unless indeed it be Cozens, a man of some genius and a friend of Dr. Malton, from whose drawings and conversations he was probably learned by the two young painters. Girtin was Turner's senior by a year or two, and as he was the more regularly educated artist, it is not unlikely that he was to some extent his companion's tutor; certain it is that their drawings were very similar in style—the chief difference being that Turner made out his details more carefully—and some have fancied that had Girtin lived he would have been as great a painter as his friend. He gave early promise of success, however, for he died (Nov. 6, 1802) up to the early age of twenty-seven. Turner, with more self-control and perseverance, laboured steadily on, and rose in good time to the undisputed supremacy in his branch of art.

Ten years before he entered the Academy as a student, in 1787, when only twelve years of age (supposing his baptismal year was the year of his birth), Turner made his bow to the public as an exhibitor at the Royal Academy (under the name of 'the son of Turner') of two drawings, 'Dover Castle' and 'Wanstead House'; the first being exhibited in 1790, the year following his admission as a student, when he sent a 'View of the Archbishop's Palace, Lambeth.' From this time till his death—a period of sixty-years—he regularly contributed to every exhibition of the Royal Academy, with the exception of the years 1821, 1824, and 1848, sending in all 289 pictures, a very large proportion of them being paintings of considerable magnitude. But these alone would give a very inadequate notion of his labours and labours. He also sent a number of drawings every year, and was the most remarkable exhibitor in the Royal Academy. He also sent to the British Institution some twenty oil paintings which had not been exhibited at the Academy, and painted a large number, and some of them his chief works, which, with all other, he bequeathed to the nation, being hundreds of water-colour drawings and sketches for engraving. For some ten or twelve years he painted chiefly, if not exclusively, in water-colours, his pictures—with the exception of two or three fancy subjects, such as 'The Battle of the Nile,' his 'Fourth of May,' his 'Dreadnought,' 'Prodigality,' 'The Infancy of Christ,' 'The Holy Family,' another (1807) 'A Country blacksmith disputing upon the price charged to the Butcher for shoeing his Pony,' another (1808) 'The Unpaid Bill, or the Dentist reproving his Son's Prodigality,' and another (1809) 'The Gazetteer's Petition;' but even from these strange whims he seemed to gather new strength. At this time however he appears to have studied with most steadfastness the stormy ocean, and never yet has the sea in its wildest fury been represented on canvas with such wonderful power. In his '1805' and '1806,' and 'The Limehouse Packet,' the fortresses of Malakoff and Sebastopol, the battles of Balaklava and Sebastopol, the loss, and the strength of the British fleet, are represented not only in their true proportions, but also in the true position of the ships, and the distant and near view is taken of their performances, which no other artist has been able to do. The 'Gloomy Morning,' 'The Fairy Bower,' and 'The Fort at Anacreon,' are still among the poetic treatment of views of places, such as his 'Edinburgh from Calton Hill,' '404; Fall of the Rhine at Schaaffhausen,' '1805,' and 'Sun Rising through Vapours,' 1806, not only enabled them to hold their place, but remain among the very choice subjects in the gallery of the British Institution. He was also a great admirer with the connoisseurs his 'Narcissus and Echo,' 1814, 'Mercury and Mars,' and 'Apollo and Python,' 1811, his 'Dido and Aeneas,' 'Aphelis,' and a long list of other mythological themes. He had his own most singular way of depicting these. He went to the seaside with as many talents and riches as he did not want to be in truth the least poetical of his works, and infinitely inferior to his other and more
purely imaginative productions of this period, 'Snow-storm—Hannah crossing the Alps,' and the like, in which he almost for the first time portrayed with some approach to the vastness and splendor of nature the fierce encounter of the elements, the splendor of the rarer phenomena of the atmosphere, and the beauty and glory of the mountains.

In 1807 Turner was elected professor in perspective to the Royal Academy, and for several years he continued to give courses of lectures to the students, in which he spoke of his own compositions by the great landscape painters of earlier times, of their principles of effect and of colour, and compared them though sparingly with the teaching of nature; but the lectures were never printed, and we know no fragment of them. Report has always spoken of them however as ill-arranged and ill-delivered, confused in style, and obscure in illustration. They never succeeded in securing the attention of the students, and for many years before he resigned his professorship he had ceased to deliver any lectures.

An important circumstance in the earlier career of Turner was the publication of his 'Liber Studiorum,' which was commenced in 1808. This now famous work was undertaken in rivalry of the book of sketches known as the 'Liber Veritatis' of Claude, and the possession of the Duke of Devonshire, of which a series of fao-simile aqua-tinta engravings was made by Earlom and others. Turner's views were engraved in a similar style, some of them by Turner himself, and as many as possible of the principal forms of landscape composition, and displayed a fertility of resource and an intimate observance of nature such as the publication of no previous landscape painter had approached. The work has long been extremely rare, and only a few specimens of high expense and two re-publications of it have been announced. From this time to his death Turner remained the most in request with publishers and engravers of any English landscape-painter, both for the landscape illustration of books and for series of engravings; and even where his eccentricities of colour, as they are called, repel, his engraved designs are with few exceptions received with unmitigated delight. Among the most famous of these engraved works may be mentioned the 'Scenery of the Southern Coast—England and Wales,' 'Rivers of England,' 'Rivers of France,' Rogers's 'Italy' and 'Poems,' of all his vignette engravings the most exquisite, the poems of Byron, Scott, &c. From his paintings likewise some very noble line-engravings of large size have been made by Fye, Wollaston, Milier, Prior, &c.; while Turner's grand engraving of 'The Shipwreck' is one of the richest specimens of mezzotinto. We cannot in a sketch like this trace the progress of the pupil and the man, the important events recorded of his life—the production of his chief pictures. He made three visits to Italy in 1819, 1820, and 1840, and after each his style underwent a remarkable change. The usual division of his style is, as a whole, the least convenient. Neither visits, paintings, nor periods, accordingly, have been of much service. The first visit to Italy was that which was the most important one, does not however exactly correspond with the first visits. Turner's career, it is said, comprises three distinct periods; the first reaches to about his twenty-seventh year, when he was elected into the Academy, and during which he was chiefly noticeable as a water-colour painter diligently occupied in drawing from nature, and at the same time forming for himself a style, by carefully studying (and imitating) the methods of his English predecessors, Wilson, Liotterbourgh, and Stothard, and a degree, Guisborough, the influence of whose works is very apparent in his early efforts: the second period ranges from 1802 to 1830, in which he is seen at first a follower of Claude, and, in a less degree, of Gaspar Poussin, but rapidly disseminating himself from the trammels of every kind of pugnace to great names and striking out a style of landscape-painting entirely original and wholly unirrilluated for brilliancy of colour and effect: while the third period, dating from his second visit to Italy, in 1829, is one in which everything else was sacrificed in the interest of this, and in his whole style of light and colour—to make (in the strange language of his own 'MS. Fallacies of Hope')

the sun
Enahle earth's humid bubbles, and, embers of light,
Refract her forms each in prismatic guise.

But while such a division is convenient it must not be regarded as anything more. Like every great artist, his conceptions were always advancing and expanding, and in each period were painted pictures that would seem justly to belong to another. At which period he painted best it is difficult to say, and judges of art pronounce widely different opinions. It is quite certain that to some ten or twelve years before his death, his knowledge of the phenomena of light and colour, and the means of expressing them with that brooding, inexpressible effect, was beginning to expand, even when his hand failed to express faithfully his intentions, or his impatience prevented him setting them forth with due elaboration. Any one who has carefully studied Turner's works chronologically, and who has seen him at work, will feel that he has never been as an artist in the full sense of the word; for the same works that have been as evidently as it has been swiftly progressive, and in different stages of the struggle, sometimes one order of truth, sometimes another, has been aimed at or omitted. . . .

As he advanced, the previous knowledge of his ambition was absorbed in what succeeded, or abandoned only if incompatible, and never abandoned without a gain; and his latest works present the sum and perfection of his accumulated knowledge, delivered with the impatience and passion of one who feels too much to allow any longer to have too little to say to it in pause for expression, or to ponder over his syllables." ('Modern Painters,' i. 401.)

It would be easy to refer to examples illustrative of Turner's different periods, but so large a number of his works have been sold and dispersed amongst private property, and through the care of Mr. Wornum have been so well arranged, dated, and catalogued, and rendered so easy of reference, that a special mention of any is needless. A cursory examination (with attention to the dates) of that collection will suffice to show the extreme diversity of his output. A glance through the public galleries, will sufficiently illustrate what has been said of the progressive and, as it were, tentative character of his mind; and a studious consideration will convince the visitor that amongst all his works Turner's wildest aberrations from the sobriety of nature, there is a foundation of truth for the idea he has endeavoured to work out, and that his failures, while they arise sometimes from wildness, arise more often from his attempting to represent unusual phenomena by materials utterly inappropriate for the purpose. Turner in fact never seems to have understood the limits of his art, and in seeking to accomplish what is impossible with such means as he possessed, and with such necessarily imperfect skill, he became extravagant and bizarre. Although eccentricities of colour and indefiniteness of form were at all times charged upon his paintings, the extreme development of this fault is chiefly urged against the works executed during the last twenty years, usually from 1830 to 1840. This is the period of unfailing suggestiveness, to an artistic eye, in every one of them, it is upon these works that censure will eventually rest. Yet it is remarkable that to this period belongs the work in which, by general consent, his unrivalled powers are most clearly displayed. We have reached the fullest development, his 'Childo Harold, or Modern Italy,' (now at Marlborough House) which was painted in 1822; and to this period also belong some of his most poetical efforts, including 'The Fighting Temeraire lugged to her last Berth' (1839), and the 'Slaves throwing overboard the dead and dying—Typhon coming on' (1840).

Turner died on the 19th of December, 1851, in humble lodgings, which he had taken in an assumed name, by the name of Mr. Coke. He was then living near the 'Trinity' in the crypt of St. Paul's Cathedral by the side of Reynolds, Wilkie, Fuseli, and others of our eminent painters. Turner was a man of unsocial and reserved manners, and many gossiping stories are related of his eccentricities and love of money: but they bear on their face a coloured and exaggerated character. It is certain that he had hoarded his money for no selfish purpose. For many years he had refused to sell of his best pictures, and when any pictures or drawings of his were sold, he never gave any account of the sale, if he possible purchased them. On his death it was found that he had by his will bequeathed to the nation all the pictures and drawings then collected in his residence, and the funds raised by the sale of some of his pictures to the Trust, which was to be used to build a suitable gallery for erected for them within ten years; and his funded property to found an asylum at Twickenham for decayed artists. Unfortunately the will was unskilfully drawn, and a suit in chancery ensued, but it was compre-
mised by the engravings and one other property being transferred to the next of kin, which disputed the will, while the paintings and drawings were held by the nation. The oil paintings, one hundred in number, include many of his finest works as well as examples of his pen from the outset to the termination of his career; they are for the present exhibited at Marlborough House. The finished drawings, which number several hundreds, and the sketches, which amount to some thousands, have been (or are being) exhibited by Mr. Ruskin, who volunteered his services to the government; and a choice selection of them is now hung on screens at Marlborough-House. Among those now exhibited are many admirable drawings in colours, and numerous sketches and drawings of scenes on the Rivers, &c., of which are of an exquisite beauty and brilliancy of effect, probably unequalled among drawings of that character. The nation also possesses in the collections presented by Mr. Vernon and Mr. Stephens and several other choice examples of Turner's pencil.

There is no need to add anything to what has been said respecting the rank which Turner holds among the landscape painters either of his own or an earlier time. But as his style was a more perfect composition of character, perhaps in part owing to the indiscernible eulogy which has of late years been heaped upon him—and as it is sometimes said that, if he were the great painter so strongly admired by his contemporaries, and writers on art would not be slow to acknowledge his superiority—it may be well to quote the calm judgment of a German writer whose authority is admitted, and whose opinion is the result of a repeated consideration of his works. Dr. Wegelin says: "His powers are so great, that his art seems to be an expression of something beyond his own province, perhaps with such versatility of talent. His historical landscapes exhibit the most exquisite feeling for beauty of lines and effect of lighting: at the same time he has the power of making them express the most varied moods of nature—a lofty grandeur, a deep and solemn atmospheric, a sunny cheerfulness and peace, or an up roar of all the elements. Buildings he also treats with peculiar felicity; while the sea in its most varied aspect, is equally subservient to his magic brush. His views of the past have yet sustained them; and he inspire the spectator with pensive feelings such as no other painter ever excelled in the same degree, and which is principally attributable to the preceding picturesqueness of the point of view chosen, and to the beauty of the lighting. Finally, he treats the most common little subjects, such as a group of trees, a meadow, a shaded stream, with such art as to impart to them the most picturesque charm. I should, therefore, not hesitate to recognise Turner as the greatest landscape-painter of all times, but for his deficiency in one instrument of art, and in the application of the technical basis."—("Treasures of Art in Great Britain," 1854, vol. i., p. 383-4.)

TURNER, SHARON, was born in London on September 28, 1820. Her father was Mr. Theodore Wilkins, who was kept by the rector of St. James's, Clerkenwell, and at the age of fifteen he was articled to an attorney. On the death of his master, before his clerkship had expired, he succeeded him in his business. Even during his clerkship he had felt the promptings of a literary taste, and had occupied his leisure by studious reading and composition. While in business for himself he began to collect materials for his "History of the Anglo-Saxons," of which the first volume was published in 1850, and the third in 1853. It is the only work which has been written by a woman on the subject, and has been generally sustained now that the study of Saxon literature has been more appreciated, and the authenticity of his materials more vindicated, and a permanent place in the historical literature of the country, and, encouraged by his success, he continued his history from the Norman conquest to the death of Elizabeth, published in 1859. This portion, though distinguished by a large amount of industry, and the discovery in consequence of a few hitherto unknown facts, was not equal to the previous portion. Where the field was less new he had no advantage over previous writers; his views had little originality, and his treatment of his subject had no superior merit. In 1829, after suffering from illness, he removed to Winchester, where he prepared and published in 1832 the first volume of his "Sacred History of the World," as displayed in the Creation, and subsequent events to the Deluge. Mr. Turner's object was to be philosophically considered in a series of Letters to a Son." Two other volumes completed it, the object being, from temporal history, to establish the principle of minute providential agency or supervision. In 1849 the death of his wife occasioned him much distress, and increased his desire to return to London, where, in his old residence in Red Lion-square, he died on February 13, 1847. Besides the works above-mentioned, he published a volume of essays and poems under the title of "Sacred Meditations," by a Layman, a "Prolusion on the Greatness of Britain, and other Subjects;" "Richard III., a Poem;" and he contributed two or three articles to the "Quarterly Review." Some letters which he addressed to the Royal Society of Literature, of which he was an associate, on his own work and productions of the classical languages of the world, have been added to the last edition of his "Anglo-Saxons."

TURNER, THOMAS HUDSON, was born in London in 1816. His father was a painter in the employment of Mr. Bulmer in Pall-Mall, and on his decease his family was assisted by Mr. W. Nicol, the nephew and successor of Mr. Bulmer, who placed young Turner at school at Cheltenham, where he early distinguished himself by his love for humanitarian research, and formed a friendship with the two sons of the late Allan Cunningham. With the younger, Peter, his friendship continued until his death. In 1831 he was taken into the printing-office of Mr. W. Nicol to learn the business. While here he employed all his leisure in pursuing his own studies, and, on seeing an advertisement for a young man at the Record Office in the Tower who could read and translate records, he applied for and obtained the situation.

He devoted himself with great diligence to the study of the records, and his knowledge increased as he projected many historical works, but his labours in acquiring constantly fresh information prevented his carrying his many plans into execution. From this employment he was taken by Mr. Tyrrell, the Remembrancer of the City of London, to assist him in collecting materials for a history of London, at which he most assiduously laboured, but the information thus collected remains yet in manuscript. When this was completed he edited with remarkable care a small volume of the "Gleanings of London," 1848, which fixed a valuable introduction; the work being presented to the Roxburghe Club by Mr. Beriah Botfield. After the publication of this volume he was made secretary to the Proceedings of the "Archaeological Journal," published between 1846 and 1851. In 1852 his readiness in imparting information respecting antiquities was remarkable; he wrote some valuable papers for the "Journal" of the Society, and communicated several records to the Society of Antiquaries at Newcastle, which are printed in the "Archaeologia Zilliana." On his retirement from this office, he continued his studies, but commenced his work, "Some Account of Domestic Architecture in England, from the Conquest to the End of the Thirteenth Century, with numerous Illustrations," which was published in 1851. His work, "A Survey of the Conjectural Antiquities of England," published between 1846 and 1851, formed the groundwork of his fame. The papers only amount to five, and one of them is on the dining-customs of the Middle Ages, a subject similar to that of his book. The "Journal of Archaeology" is noticeable for the exactitude and wide extent of his knowledge, and is a valuable contribution for the study of English antiquities. It does not confine itself to the mere building, but includes a large amount of subsidiary information, in connexion with the study of the country records, and comprehends an account of the furniture; the implements used in the processes of cooking, brewing, baking, &c.; the state of agriculture at the time; with the description of the condition of the London household economy, such as glass, linen, cutlery, &c. Mr. Turner's severe and constant application to his studies had for many years greatly impaired his health, and on June 17, 1852, he died, having produced far less than from his
great accomplishments could have been wished and might have been expected. His vast store of knowledge was freely scattered in conversation; he had constant applications for information, and few were sent away unsatisfied; but his ardour for accumulation prevented his application to composition, so that of his many projected works the one above-named was the only one he announced, and that was in a manner but a fragment: at any rate, Mr. Turner promised to carry down the subject to a more recent period, a promise he did not live to fulfil. A second volume has however been prepared and published by Mr. Parker of Oxford.

TURTONA, a genus of Conchiferous Molusca, named by Mr. Hanley after Dr. Turton. There is but one species, T. minutus, which has been separated from the genus Kellia. The shell is oblong, inequilateral, anterior side very short; ligament concealed between the valves; hinge-teeth 2-2. Animal with the mantle open in front; foot large, keeled; siphon, single, slender, elongated, protruded from the long end of the shell. It is found in Great Britain; also in Norway and Greenland. (Forbes and Hanley, British Moluscoa; TUSCANY. The territory of Luca fell to Tuscany in 1847.

[LOCCA.] The Grand-Duchy is divided into compartmenti, or provinces, as in the following table:

<table>
<thead>
<tr>
<th>Province</th>
<th>Area in</th>
<th>Population in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Florence</td>
<td>2,264</td>
<td>718,701</td>
</tr>
<tr>
<td>Luca</td>
<td>310</td>
<td>255,304</td>
</tr>
<tr>
<td>Pisina</td>
<td>1,174</td>
<td>231,473</td>
</tr>
<tr>
<td>Siena</td>
<td>1,465</td>
<td>199,159</td>
</tr>
<tr>
<td>Arezzo</td>
<td>1,265</td>
<td>221,900</td>
</tr>
<tr>
<td>Grosseto</td>
<td>1,710</td>
<td>88,980</td>
</tr>
<tr>
<td>Livorno</td>
<td>33</td>
<td>44,129</td>
</tr>
<tr>
<td>Isle of Elba</td>
<td>56</td>
<td>21,159</td>
</tr>
<tr>
<td>Total</td>
<td>5,494</td>
<td>1,613,656</td>
</tr>
</tbody>
</table>

TWICKENHAM. [Middlesex.]

TYPTUS FEVER, TYPHOID FEVER. [Physic, Practice of (Blood, Diseases of), S. 2.]

TYTLER, PATRICK FRASER, was born at Edinburgh on the 30th of August, 1791, the fourth son of Alexander Fraser Tytler, Lord Woodhouselee. He was destined to increase the literary reputation of a family in which literary taste and talent seemed hereditary. After having been educated at the High School and the University of Edinburgh, he became a member of the Scottish Faculty of Advocates in 1813, but he soon abandoned practice for authorship. On the peace of 1814 he accompanied Mr. (now Sir Archibald) Alison and the present Lord-Justice Clerk of Scotland on a visit to the Continent. His first literary efforts were a contributor to 'Blackwood's Magazine;' but in 1815 published in Edinburgh an independent work entitled 'Life of James Cluni, commonly called Admirable Crichton.' The work resolved a second edition in 1823, when an 'Appendix of Original Papers' was added to it. In 1823 he published 'The History of Scotland' (from the Life of Sir Thomas Craig of Riccarton; including biographical sketches of the most eminent legal characters from the institution of the Court of Session by James V. till the period of the Union of the Crowns; and this was followed in 1826 by 'Life of John Wylye,' published anonymously. It was about this time that, on the earnest suggestion of Sir Walter Scott, who had at one time thought of undertaking the task himself, he began his great work, 'The History of Scotland.' The first volume was published in 1828, and the work was completed in nine volumes in 1845. It has since been passed through several editions, and is recognised everywhere as the standard History of Scotland—the only work in which Scottish history is treated at full length on the basis of authentic materials, and in a calm and accurate style distinct from a merely popular manner. It commences with the accession of Alexander III. to the Scottish throne in the 13th century, and brings down the narrative to the union of the crowns in 1606. While writing this work, Mr. Tytler resided sometimes in Edinburgh, sometimes in London, collecting materials in both places. During the time that the work was in progress he threw off other smaller historical works, of which the following is a list:—'Lives of Scottish Worthies,' in 2 vols., 1831-32; 'Historical View of the Progress of Discovery on the more Northern Coasts of America,' published in Edinburgh in 1822, and recently re-edited in America; 'Life of Sir Walter Raleigh,' 1833; 'Life of Henry the Eighth,' 1837, and 'England Under the Reign of the Red Monarch,' published by Mary, illustrated in a series of original letters, with historical introductions and notes, 1839. Mr. Tytler also wrote the article 'Scotland' for the seventh edition of the Encyclopaedia Britannica, and the article has since been re-published as a useful abridgment. In recognition of claims so well founded, Sir Robert Peel's government conferred on Mr. Tytler a pension of 2000 a year. In politics he was a Conservative. Though an Episcopalian, he took much interest in the Scottish Presbyterian movement of 1834-43. In private life he was much beloved for his social qualities. Towards the close of his life he suffered much from ill-health, and went abroad for a time. He returned to Edinburgh, and died on the 24th of December 1849. He was twice married, and left two sons and a daughter by his first wife.

UDORA, a genus of Plants belonging to the natural order Hydrocharitaceae. A proable species of this genus has been recently introduced into England, and described by Badingon under the name of Anacharis alnus maritimus. The following is his description in the 'Manual of British Botany':—

It has its leaves 3 in a whorl, oval-oblong, obtuse, serrulate (the male flower is unknown), the female flower with a tube 3 or 4 times longer than the sepals, five greenish-white filaments, sessile, stamens reflexed. The stem is long, branching; whorls of leaves many included. Flowers subtended by a leaf-like bract placed within the whorl of leaves. Flowers very small. The sepals tinged with green and pink externally, incurved, hooded, with a narrow distalmost margin. The petals are flat, diaphanous, recurved, and oblong. Filaments at first curved onwards, their points placed under the hood of the sepals, afterwards erect, linear, blunt, diaphanous; stigmas recurved, linear, or deepily bifid; sepals, petals, and stigmas, of about equal length; the style adnate on three sides to the tube.

This plant was first observed in Great Britain by the late Dr. Johnson of Berwick-upon-Tweed, in the river Whiteadder, in Berwickshire. It was afterwards discovered in a canal near Nottingham, and subsequently in many other places. Although at first not known, yet late inquiries have led to the conclusion that this plant is the Udera Canadensis of American botanists, and that it has been introduced into this country by means of the timber that is brought from the New World. Its power of retaining its vitality adapts it to bear so long a journey without destruction. The peltilliferous plants have alone been seen in Great Britain. Its power however of reproducing itself by buds is so great that it has already become a serious pest in the rivers, canals, lakes, and ponds with which it has been introduced. Anacharis alnus maritimus is one of those plants in which a circulation can be seen, and has afforded some observers the means of more closely watching these vegetable movements than by any other plant that yet has been observed. It has been inferred by Dr. Branson and others, that the movements of the cells-contents of this plant are produced by cilia. Mr. Wenham however regards this movement as originating in the molecular activity of the protoplasmic endoplasm. (Badingon, The Life of Botany, New Water-Weed; Branson and Wenham, On the Sap-Circulation of Anacharis alnus maritimus, in vol. iii. of the Quarterly Journal of Microscopic Science.)

UMPERI. [Arbiration, S. 2.]

UNION. [S. 2.]

UNITED STATES OF NORTH AMERICA, a Republic, formed by the federal union of States and Territories.
It occupies the middle portion of North America; and extends between 32° and 49° N. lat., 67° and 120° W. long.; from the Atlantic Ocean on the east to the Pacific Ocean on the west. It is bounded N. by British America, S.W. by the republic of Mexico, and S. by the Gulf of Mexico. The boundary line between the United States and British America is marked under Usur in States, S. I., the greatest width of the United States from east to west is 990 miles, the greatest length from north to south is 1730 miles. The entire area of the United States has been very differently estimated. As estimated by the United States authorities for the Census office in 1850, it amounted to 3,208,921 square miles. But a more elaborate and careful estimate made by the United States Topographical Bureau, January 1854, reduces the area to 3,935,166 square miles, and if to this be added the additional territory of 27,500 square miles, ceded by Mexico by treaty in July 1854, the total area at the present time will be 3,963,656 square miles. The population in 1850 was 22,191,676, or 7.90 to a square mile: but this does not include the native Indians, who were estimated by the Indian Commissioner in 1853 at 400,704. The following table shows the States and Territories comprised in the Union, with the extent of each, the number and character of its population in 1850, and other particulars.

The areas of several of the States and Territories in this table are given from the new computations made by the United States Topographical Bureau, and recently made public in the 'Statistical View of the United States,' drawn up and printed by order of Congress.

The physical geography of the United States has been given generally under America; and more particularly under the heads of the several States and Territories; of the rivers Columbia, Minnesota, Missouri, Arkansas, and Rocky Mountains, &c.; the lakes Erie, Ontario, &c. The total area of the United States, as already stated according to the revised calculations of Colonel Abert, of the United States Topographical Engineers, is 3,963,656 square miles, which he thus apportions—Area of the Pacific Slope, or of the region watered by rivers falling into the Pacific, 792,702 square miles; the Mississippi Valley, 1,517,593 square miles; and the region whose waters fall into the Atlantic, 932,960 square miles, of which 514,415 square miles belong to the Atlantic slope proper, 112,649 square miles to the Northern Lake region, and 325,333 square miles to the region whose waters fall into the Gulf of Mexico, east and west of the Mississippi. The main shore line of the United States on the Pacific coast amounts to 6291 miles, on the Pacific to 2281 miles, on the Gulf of Mexico to 3467 miles; the island shore on the Atlantic to 6328 miles, on the Pacific to 702 miles, and on the Gulf of Mexico to 2217 miles, giving a main shore line of 12,059 miles, and an island shore line of 9247 miles.

The following table taken, with a few slight changes to render it more readily understood by English readers, from the official 'Compendium to the Census,' will show at a glance the extent of the territorial acquisitions, and the occasions on which they were made:

<table>
<thead>
<tr>
<th>Territory</th>
<th>Square Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area of the United States at the peace of 1783</td>
<td>820,650</td>
</tr>
<tr>
<td>Purchase of Louisiana from France, 1803</td>
<td>825,729</td>
</tr>
<tr>
<td>Cession of Florida by Spain, 1819</td>
<td>86,900</td>
</tr>
<tr>
<td>Admission of Texas (see Texas), 1845</td>
<td>306,002</td>
</tr>
<tr>
<td>Territory obtained by Oregon treaty with Great Britain, 1846</td>
<td></td>
</tr>
<tr>
<td>Territory ceded by Mexico (see Mexico), 1848</td>
<td>522,053</td>
</tr>
<tr>
<td>&quot; addition ceded by Mexico by a new treaty, 1854</td>
<td>27,500</td>
</tr>
<tr>
<td>Total</td>
<td>2,963,656</td>
</tr>
</tbody>
</table>
The following table shows the rate of increase of the various classes of the population at the several censuses of the Union, except the census of 1840, which is given under United States.

<table>
<thead>
<tr>
<th>Class</th>
<th>1790</th>
<th>1800</th>
<th>1810</th>
<th>1820</th>
<th>1830</th>
<th>1840</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>3,172,464</td>
<td>4,504,436</td>
<td>5,592,004</td>
<td>7,684,101</td>
<td>10,037,278</td>
<td>12,053,068</td>
</tr>
<tr>
<td>Free blacks</td>
<td>278,931</td>
<td>400,000</td>
<td>553,902</td>
<td>883,041</td>
<td>1,150,000</td>
<td>1,387,000</td>
</tr>
<tr>
<td>Slaves</td>
<td>1,897,532</td>
<td>3,004,436</td>
<td>3,265,902</td>
<td>4,000,003</td>
<td>2,000,013</td>
<td>3,004,813</td>
</tr>
<tr>
<td>Total</td>
<td>8,388,927</td>
<td>10,909,872</td>
<td>13,347,848</td>
<td>16,467,154</td>
<td>15,203,068</td>
<td>16,341,978</td>
</tr>
</tbody>
</table>

The commerce of the United States has gone on rapidly extending, until next to that of Great Britain it is the largest in the world. In the year ending June 30, 1866, the total imports of the United States amounted to 314,633,942 dollars; the exports to 326,964,908 dollars; of which 310,868,330 dollars were of domestic produce, and 16,378,678 dollars of foreign produce. Of the foreign trade, consider-
ably more than half is with Great Britain and its dependencies. The total amount of tonnage engaged in the foreign trade was 9,871,062. The total number of American vessels entered from foreign countries in 1856 was 10,507, of foreign vessels, 11,375; the clearances during the same year were, of American vessels 10,592, of foreign vessels 11,186. The registered tonnage of the commercial navy was 2,401,403. The crews of American vessels cleared out numbered 122,971 men and 1070 boys. There were in 1857 of canals 4796 miles; of navigable rivers and navigable miles connected 10,000 miles.

The naval and also the military forces will be found under MILITARY AND NAVAL FORCES, S. 2.

The revenue of the United States for the year ending June 30, 1857, was 3,631,311 dollars, of which 60,975,900 dollars were raised by excise duties, and for the same year was 70,852,724 dollars. Of this 6,943,896 dollars was for interest on and redemption of the public debt, which amounted to 30,958,909 dollars.

The following is a list of the Presidents, continued after those previously given (v. xxvi. p. 12):——

10. John Tyler, 1841 to 1845
11. James Knox Polk, 1845 to 1849
12. Zachary Taylor (died in office), 1849 to 1850
13. Millard Fillmore, 1850 to 1853
14. Franklin Pierce, 1853 to 1857
15. James Buchanan, 1857

From the establishment of their position as an independent republic until the present time, the United States have been chiefly occupied in the development of their vast resources. Much has been done in the year 1866 towards the improvement of navigation, and the advancement of science has been a principal topic of conversation. The discovery of the 'Penny Cyclopaedia,' after explaining generally the processes of observation and reasoning by which the science of physical astronomy has attained its present degree of perfection, gives a series of brief historical notices of the discoverers in astronomical science, and of the most important of the observations and developments which have been brought down to the year 1830. The most important of the instruments by which the processes of astronomical observation are carried on are elaborately described, with the addition of figures accurately drawn, under the heads Celestial ASTRONOMY; EQUATORIAL INSTRUMENT; REPEATING CIRCLE; and Sextant; and also under PENDULUM and TELESCOPE.

The collection of revolving bodies of which the sun is the centre, is described generally under the head SOLAR SYSTEM; and the Newtonian theory of that system is explained under the head GRAVITATION. The sun and each of the large planets are described separately under their respective names, Sun, Mars, Mercury, Venus, &c. The earth and the earth's satellite are described under the heads Earth, Astronomical; EQUATORIAL INSTRUMENT; REPEATING CIRCLE; and Sextant; and also under PENDULUM and TELESCOPE.

So far as to the solar system, the starry heavens have a distinct article Stars, Double Star, Cluster of Stars, Nebulae, and there is also an article on the obscure masses of stars called the Milky Way.

The additions made to astronomical science since the completion of the 'Penny Cyclopaedia' have been as numerous and important, that a detailed account of them would be scarcely possible except in a work wholly devoted to the subject. It may be sufficient here to indicate broadly some of the leading facts which have a general rather than a purely scientific interest, yet which will serve to illustrate the revolution in astronomical science.

First in rank we may place the determination of the motion, or movement of translation, as it has been termed, of the entire solar system in space. The possibility of such a movement was suggested by Bradley in 1748, and this hypothesis was dismissed by subsequent astronomers, but the elder Herschel was the first who sought by actual observation to verify or disprove the notion. His observations, which extended over more than twenty years (1783-1806), led him to conclude that such a movement did really exist; and as our solar system is moving towards the constellation Hercules, it remained, however, long a mere hypothesis. [Solar System, vol. xxii, p. 196.]

The first important step towards its confirmation was made by Argelander, in a paper published in the 'Mémoires' of the Imperial Academy of St. Petersburg for 1837. By comparison of the proper motions of 290 stars given in his own catalogue of 600 stars observed at Abu, with those of Bradley as given in the 'Fundaments of Astronomy,' Argelander verified the fact of the motion, and found the duration of the movement which the system would be expected to be situated in the same constellation as Herschel supposed. Other astronomers pursued the enquiry with great zeal and industry, but the decisive step is ascribed to another Russian astronomer, Mr. Litter, of Petersburg, whose paper (On the MMORPHOGENIC STANCE OF THE PRECISION WITH BEUGER WINDIGEN DER SEHTE) was printed in the St. Petersburg 'Transactions' for 1842, was regarded as having set the question at rest, and was, on account of its importance, awarded the gold medal of the Royal Astronomical Society of London, in 1850. The results of these researches of Argelander and Struve are thus summed up by the elder Struve in his 'Études d'Astronomie Stellaire,' p. 105, [see Grand History of Physical Astronomy, p. 507.]

"The movement of the solar system in space is considered to be a point in the celestial sphere, situated on the right line which joins the two stars of the third magnitude, w and h, in Hercules. The velocity of this motion is such, that the sun, with the whole corps of bodies depending on him, advances annu-
ally in the direction indicated, through a space equal to 1,632 radii of the terrestrial orbit, or 154 millions of miles."

The observations which led to this great discovery were all made on stars of the northern hemisphere. It was most significant that at that time no more than 274 stars were the subject of the researches of Argelander and Struve, and that the motion thus discovered in the great system of the stars would be of the same order as that of the stars of the northern hemisphere. This laborious task was under-taken by Mr. Galloway, Employing the catalogue of 64 stars of Argelander and Struve, the observations were made on 172 stars observed by Mr. Henderson at the Cape of Good Hope, with the older determinations of Bradley and Lacaille, he arrived at almost exactly the same conclusions as Argelander and Otto Struve; the reality of motion being proved, and the point of motion being nearly identical. For this work Mr. Galloway received the gold medal of the Astronomical Society. Finally, to remove all possibility of doubt, if any remained, Mr. Main contributed to the Astronomical Society, in 1853, a catalogue of 765 stars observed at Greenwich, in which the accuracy of the inves-
tigations of Argelander and Struve was fully established.

The fact of this rapid movement of the entire solar system in space is of great importance in practical astronomy; while the study of the question of whether there does or does not exist a general centre of gravity, to which is subjected not only our own solar system, but the whole stellar system, is one of the most important questions of astronomy. The reality of solar system has attempted to arrive at conclusions more or less certainly the subject, but as is well said by Sir John Herschel, noticing some of their theories: 'In the present defective state of our knowledge respecting the proper motion of celestial bodies, and the direction in which it is to be sought, we should regard as to a certain extent premature, though by no means to be discouraged as forrunners of something more decisive.'

A subject which has long been one of primary interest in astronomy, is that of the constitution of the central body of our solar system. The then actual condition of our know-
At its peak, the spots on the sun have been carefully watched by many skilled observers. The observations and investigations of Dr. Bohn, Mr. Dawes, and others, have been particularly valuable. One of the chief points ascertained was that, by Mr. Dawes (in 1859), of the rotation of the sun's spots.

The latest important contribution on this particular subject was that of M. Schwabe of Dussan, which obtained for the sun's rotation at 4.9 degrees per month. It has already been noticed that the Sun is keeping for the period of the astronomer a continuous record of the changeful progress of the spots upon his disc.

We may add, that by the very refined means now in use, photographs and daguerreotypes are now obtained almost exactly parallel to the position of the spots on the sun, but even of Jupiter and his belts, and of numerous astronomical phenomena of a kind which, from their fugitive nature, could only be hitherto described in words or depicted from memory.

With respect to the lunar atmosphere, a negative opinion has likewise been arrived at; though whenever an instrument of increased power, or a stellar phenomenon, appears likely to afford a new or more precise test, it is carefully brought to bear upon the question. Thus a delicate test is the exact observation by a telescope of high magnifying power of the occultation of a planet. If the moon were enveloped in an atmosphere, there would be some change of form or brightness in the planet, owing to atmospheric absorption or reflection of the moon's light upon the immersion, or reappearance of the planet.

None such however has been observed with the powerful instruments which have been employed for the purpose of late years. On the contrary, the intensity of the moon's light, by the most minute difference, does not appear to be diminished in any respect whatever, even with the slightest deflection of the planet's light, and in precise accordance with calculation as to time.

Another question of great interest has also been solved; that of the true heat, or the actual sensible heat, of the light of the moon.

Various experiments had at different times been made with a view to determining whether the lunar rays gave any appreciable warmth, but without success. At length, in 1846, Signor Meissoni, an eminent Italian astronomer, renewed the experiment on the cone of Mount Vesuvius, and succeeded, by means of a large lens of peculiar construction, in obtaining satisfactory indications of elevation of temperature. Some doubt however remained as to the accuracy of the experiment, but it was dissipated by still more distinct evidence of the radiation of heat from the moon being obtained by Professor Piazzi Smyth. To resolve this and some other astronomical, meteorological, and magnetic problems, Mr. Smyth established himself, during the summer of 1866, on the summit of some mountain near Saronde, to which he had ascended, for the purpose of placing his instruments beyond the obstructing influence of the earth's grosser atmosphere. His upper station was 10,700 feet, his lower 8840 feet, above the level of the sea, and at the lower, as well as at the upper station, the warmth of the moon was distinctly felt.

A point of great interest to astronomers—what is known as the long inequality in the moon's epoch—has been satisfactorily elucidated by the labours of Professor Hansen of Gottha and of Mr. Airy, the Astronomer Royal (1846-49); the latter of whom has also discovered and explained a new lunar inequality depending upon the action of the planet Venus.

The statement of the reasons of Messrs. Airy and Hansen was not put out of place in a non-mathematical and non-technical like the present one, but it is not so indicative of the importance of these discoveries, (in the words of Mr. Grant, 'History of Physical Astronomy'), that they "completely account for the errors in the tables which had so long perplexed the astronomers and mathematicians of Europe. The lunar inequalities may therefore be considered as divested of all serious embarrassment."
group, not accidentally, but in the course of a laborious examination of that portion of the heavens, undertaken in the full expectation of finding such a body there. For, on the discovery of the second planet, Olbers conceived and published the idea that these two small planets might be fragments of a large planet which had been broken up by some great catastrophe; and if so, that these, and most likely other fragments, were describing round the sun elliptical orbits, the existences of such moons must fall near the same point. Impressed with this idea, Olbers, after a search prolonged for nearly five years, discovered, as we have said, a fourth planet—a third had been meanwhile discovered accidentally—but the laboratory to no other astronomer was so rewardingly successful, and any systematic search was gradually abandoned. Nearly forty years elapsed before a fifth, Astrea, was added to the group of minor planets. A year and a half later another was discovered; and now, after the lapse of little more than ten years, no less than forty-seven more have been found—in making in all fifty-three, of which forty-nine have been discovered from the 1st of July 1847—and all (at least since the fifth of the series) as the result of a systematic exploration made with telescopes of great power.

Without further reference to the hypothesis of Olbers, that these minor planets are the fragments of a disrupted planet, we may notice the remarkable coincidence or conjunction of their orbit respecting various dates, as quoted by Humboldt in his 'Cosmos,' Sabine's translation, vol. iii., p. 374.) "It appears to testify in favour of a real or inherent connection between all the members of the entire group of the small planets, that, if we figure to ourselves the natural dimensions of their orbits as forming interlacated rings, these rings are all so interlinked, that by taking hold of any one, all the others would be lifted by, or found suspended on it." The whole of these minor planets are what are termed telescopic rings, being invisible to the naked eye. The diameter of the largest is indeed probably less than 600 miles, but it is scarcely necessary to add, that if the whole 63 at present known—and probably more will yet be found—are fragments of one shattered planet, it must have been very large.

The four minor planets which were first discovered are all noticed under Vesta; but we give a full list of them, arranged in the order in which they were discovered, with the names of the discoverers, and the date of their discovery.

1. Ceres Piazzi January 1, 1801.
2. Pallas Olbers March 28, 1802.
3. Juno Harding September 1, 1804.
4. Vesta Olbers March 29, 1807.
5. Astraea Hencke December 8, 1845.
7. Iris Hind August 13, 1847.
9. Galathea Godin April 14, 1848.
12. Victoria Hind September 13, 1850.
13. Egeria De Gasparis November 2, 1850.
14. Irene Hind May 19, 1851.
15. Euphrosyne De Gasparis July 26, 1851.
17. Thetis Lassell April 17, 1852.
18. Meligone Hind June 24, 1852.
19. Fortuna De Gasparis September 15, 1852.
20. Lutetia Goldschmidt November 15, 1852.
22. Thalia Hind December 15, 1852.
23. Phoebe Chacornac April 5, 1853.
24. Themis De Gasparis April 6, 1853.
27. Amalthea Hind March 1, 1854.
29. Persephone Preuss September 11, 1854.
30. Pomonar Goldschmidt October 26, 1854.
31. Polyhymnia Chacornac October 29, 1854.
32. Clio Chacornac April 5, 1855.
33. Niobe Chacornac April 6, 1855.
34. Atalanta Goldschmidt October 5, 1855.
35. Dido Marth October 5, 1855.
36. Leda Chacornac January 12, 1856.
37. Lysitra Chacornac February 9, 1866.
38. Harmonia Goldschmidt March 31, 1856.
41. Ariadne Popgen April 15, 1857.
42. Nysa Goldschmidt May 27, 1857.
43. Eugenia Goldschmidt June 26, 1857.
44. Persephone Popgen August 3, 1857.
45. Aglaia Lassell September 15, 1857.
46. Dora Goldschmidt September 16, 1857.
47. Egeria Goldschmidt September 18, 1857.
49. Nymphs Lassell January 29, 1858.
50. Martha Goldschmidt February 5, 1858.
51. Calypso Lassell April 4, 1858.

The planet Saturn, from the wonderful appendices connected with it, and the general beauty as well as scientific interest which it presents to the astronomer, has always been an object of careful examination and study; and it might well have been supposed that little additional information was attainable respecting its external characters, did not every increase of telescopic power afford evidence that the field of astronomical discovery is in a measure inexhaustible. The first of the recent discoveries was made in 1848. During the autumn and winter of that year the rings of Saturn disappeared, and astronomers seized the opportunity to observe the planet with unusual care, in order to discover any proof which would seem to lead to a view of ascertaining with greater precision the diameter, if any, of his diameter from a true ellipse. In the course of this examination Mr. Bond, of Cambridge, Massachusetts, U.S.A., succeeded in discovering a very large satellite, probably some 16,000 miles in diameter, and consequently eight satellites of Saturn—but seventh is distance from the planet. This satellite, to which the name of Hyperion has been given, was first seen by Mr. Bond on the 1st of September, 1848, but its true character was not recognized by him till the 19th of that month, when it was discovered by Mr. Lassell on the 18th of September. The sidereal revolution of this satellite round the planet is 24 days, 4 hours, 20 minutes, its mean distance in semi-circle, 3 Saturns = 20:08; the revolutions and mean distances of its other satellites are given under Sat.-lune.

The other discovery—that of an inner dark, dusky, diaphanous ring, lying between the bright ring and the bed of the planet, but unattached to either—was made nearly two years later. On this occasion Mr. Bond was again one of the first discoverers, but several European astronomers detected it very nearly at the same time; and the actual priority of is of the consequence, as it is certain that the inner ring had been observed by Dr. Galilei of Bologna in 1610, and that of this by Encke in the 'Naturwissenschaftliches Archiv,' though somewhat unaccountably it had been suffered to entirely escape notice. But the discovery of this inner ring led to a more searching scrutiny of the other rings, and to the detection by our countryman, Mr. Dawes, and Mr. Heath, of an additional ring in November and December, 1851. Of Otto Struve was again led to the conclusion that the inner edge of the interior bright ring is gradually approaching the body of the planet, while the total breadth of the bright rings is increasing. Mr. Main, however, having seized upon a very large number of measurements of the rings with double-image micrometer, during the years 1856-55, for the purpose of testing Struve's hypothesis, failed to detect any increase of width, and regards Struve as mistaken.

In the article Uranus, that planet was said to have six satellites, but of which only two had been seen, except the discoverer of Uranus, Sir William Herschel. In 1847-48 two, perhaps three, of these satellites were seen, by Otto Struve, and Mr. Lassell; and in October and November, 1852, Mr. Lassell discovered seven satellites of Uranus, both apparently nearer to the planet than the first satellite of Sir William Herschel; the periods of revolution of the new satellites are respectively 4 days and 18 days; while the first of Herschel's is about 6 days. After what has been said, it is scarcely necessary to add that none of the satellites of Uranus can be seen except with first-rate telescopes.

But far more remarkable than either of these discoveries is the discovery of Neptune—as Encke expressed it, in a passage quoted by Humboldt, "the most brilliant of all planetary discoveries, because purely theoretical investigations established the antecedent prediction of the existence and the place of the new and yet unknown planet." In the motion of the planet Uranus, certain irregularities had been seen...
years observed, which could not be explained by the action
of the planets then known to exist. Several astronomers
had directed their attention to this enigma, as Bessel termed
it; but no real advance had been made towards solving the
problem when two young men, Adams and Leverrier, and
Le Verrier of Paris, devoted themselves, unknown to each
other, to the task—one of enormous labor, and requiring
great skill in the higher mathematics—of arriving by calcu-
lation at the source of the perturbation. Each arrived at the
same result in the summer of 1845, namely, that a new
planet outside Uranus, and each succeeded in indicating
nearly the same position as the spot near which it would be
found. The steps in the discovery are so fairly indicated
by Bessel, that we borrow his summary as that of a
conversation with Prof. Challis, in September, 1845:
The question was directed to Dr. Adams, of Harvard College, which he had obtained for the perturbing planet, before Pro-
fessor Challis, in September, 1845, and the same, with some
modifications, in the following month, October 1845, before
the Astronomer Royal,—still without publishing anything.
Some weeks later, and at a period long after the greatest
intention of interfering with some fresh corrections relating to a diminution of the
distance, in the beginning of September 1846. The young
Cambridge geometrian, continues Bessel, "has ex-
pounded a theory of new modesty and simplicity, a
subject of this championship successes of labours, which
were all directed to the same great object:—I mention these earlier dates merely to show that my results
were arrived at independently, and previously to the
publication of M. Le Verrier, and now I am inclined to believe, with his just claims to the honour of the discovery; for
there is no doubt that his researches were first published to
the world, and led to the actual discovery of the planet by
Dr. Galle: so that the facts stated above cannot detract in
the slightest degree from the credit due to M. Le Verrier;"
Le Verrier having communicated to Dr. Galle the results
at which he had arrived, and begged him to seek for the
predicted planet, Galle at once directed the great telescope
of the Berlin Observatory to the spot indicated, and, on the
23rd of September 1846, had the exquisite delight—the
greatest pleasant which an astronomer could experience—of
discovering there the new planet for which he was looking.
The name of Neptune has been given to the planet with the
full consent of all its discoverers, and was, I believe, first
thought they could perceive the new planet to be surrounded
by a ring, but there is little doubt that this was a mistake.
On the 10th of October 1846, however, Mr. Lassell per-
ceived what he believed to be a satellite of Neptune, but
the planet was then rapidly approaching the end of its vis-
ibility for the season, and he was unable to determine the
point. On the reappearance of the planet, he again directed
it to its great 20-foot reflector, and on July 6-8, 1847, he
reconciled with certainty, the first of Neptune's satellites.
In August 1850, Mr. Lassell believed that he saw a second
satellite of Neptune, but the discovery has not been con-
firmed.
Neptune is the most distant planet at which the existence
is known. It is 3,040 million miles from the sun in 2,068
million miles, or above thirty times the mean distance of the
earth; and more than 1,000 millions of miles farther off than
Uranus the next most distant planet (or, the mean distance
of the earth being taken as 1), that of Uranus is 19. Astronomers at the Paris Observatory, after his final res
of a sidereal revolution is 60,126 days 17 hours five minutes, or
164 years and 226 days. Its diameter is 36,000 miles, yet
so great is its distance, that it can only be discovered with
a very powerful telescope. The mass of Neptune is about
21 hours 4 minutes, at a mean distance from Neptune of
236,000 miles—or about 2000 miles less than the mean
distance of the moon from the earth.
Comets have during the last few years engaged no small
time of attention. Of which, if it can be said that a comet, whose return was predicted, appeared at the antici-
pated periods, but every year some new comets mostly
telescopic—have become visible. But the most astonishing
cometary phenomenon, and one wholly unanticipated — of
which the possibility even had never suggested itself to
any one—was the separation into two parts of Biela's comet.
This comet, which has a period of revolution of 66 years,
became visible in November, 1846, and remained visible for
several months. In April, 1847, Mr. Hind noticed a kind of protuberance in the comet; on the 26th, it
was seen by astronomers in North America to have separated into two, each being in fact a distinct comet, with its
own motion and light. The protuberance was not ob-
served in Europe till January, 1847. The two parts
which were unequal in size but similar in form, moved in the same
direction, with an interval between them of empty space, at
first equal to about 3, but which afterwards increased to
about 5000 miles. Each continued as long as they were visible, sometimes one, and sometimes the other being
the brighter. The smaller comet disappeared towards the
end of March, the larger one continued visible till the 20th
of April. The phenomenon, of course, excited great interest,
and the next periodical appearance of the comet was anxiously
expected by observers, all being desirous to know whether
it would re-appear as a single or a twin comet. It re-appeared
at the calculated period, and as a twin comet. On the 22nd
of May, the right hand portion was seen by Signor Secchi;
the other portion was first seen on the 15th of the
following September. Since they were last seen, in the early
part of 1846, the distance between the nuclei had much
increased, while the same alternations of brilliancy occurred.
The two comets were last visible in August 1850; since
then, the two parts have not been observed together; and
indeed, the severance of the two portions appears, from
a comparison of the various observations, to be complete
and permanent. The next appearance of the comet, which
will be in April, 1869, will probably go far to settle the
question.

The number of comets recorded as having been seen at
various times and in different countries amounts, according
to the reckoning of Mr. Hind, to 607. Dr. Michelson, in
his Astronomical Catalogue, 1847, at a meeting of the
Astronomers at the Royal Observatory, stated that
there are 3 comets whose return is certain (Halley's,
Encke's, and Biela's comets), 5 probably periodical, and 19
for which elliptical orbits have been calculated with some
degree of probability, making the total number of periodical
comets 27. The number of comets whose orbits have been
calculated down to December 31, 1853, amounted to 4
periodic comets, and 97 comets the returns of which to the
perihelion had not been established with absolute certainty,
making altogether 201.

One of the grandest comets mentioned in history is that
which made its appearance in the middle of the year 1284.
A very brilliant comet which appeared in 1566 is suppos-
ed by Mr. Hind to be identical with the former. This comet
was discovered in November, 1565, and was last seen in
August, 1568, and August, 1650, there being an uncertainty
of two years in the items on which the return of the
comet is calculated.

In the division of stellar systems, beyond the region
of the solar system, great activity has been displayed by astron-
omers. Zones of stars, down to those of the ninth magni-
tude, double, and multiple, and variable stars, have been
with minuting labour and perseverance observed and catalogued
by Laland and Lacaille (whose catalogue, and another of
great value, have been published by the British Association), Bessel,
Argelander, Airy, Lament, F. G. W. Struve, Chacornac,
Rümker, Cooper, and many more men of profound attain-
ments and indefatigable zeal. The value of star-catalogues
for the future is hardly beyond all question. Of the curiosity
preparation brings to light, it may be sufficient to mention as
an illustration, that the great catalogue of Mr. Cooper, made
at his observatory, Markree, Ireland, and published by the
aid of the parliamentary grant to the Royal Society, shows
that "no few of the stars previously catalogued are now
missing." On the other hand new stars have suddenly ap-
peared, and whilst Sir John Herschel was at the Cape of
Good Hope, he saw the star a Argus increase from the
20th magnitude to the 8th. In the appearance of new and the disappearance of old stars, the
mentioned the hypothesis of F. G. W. Struve, that light in
its passage through the boundless regions of space becomes
successively weakened and eventually extinguished—a theory
which, if it could be proved, would open a wide field for
reflection and investigation.

One of the most important recent additions to stellar astron-
omy is Sir John Herschel's "Results of Astronomical
Observations made during 1834-36, at the Cape of Good Hope; being the completion of a Telescopic Survey of the Whole Surface of the Visible Heavens, commenced in 1825, which was published in 1847. The first part of this survey was made in the northern hemisphere, as the continuance of his father's 'Survey of the Heavens,' which occupied most of his famous catalogue. Sir John Herschel's four years' residence at the Cape of Good Hope, in the words of Humboldt ('Cosmos,' iii. 200), 'constitutes an epoch in respect to the more exact topographical knowledge of the southern heavens; his telescope and the observatory which resulted from it for double stars, which, with a few exceptions, had never been observed before.' But double stars formed only one of several departments of astronomy which Sir John enriched by his observations and investigations. So vast, indeed, was the field opened up by his researches, that it took the author nearly nine years to digest them and prepare the results for publication in a regular form.

Passing to the nebula, we find the greatest advances due to the construction of the magnetised telescope which Lord Rosse set up on the lawn in front of his residence, Birr Castle, near Parsonstown, in King's County, Ireland. The lenses of this enormous instrument—which has 6 feet aperture and 64 feet focal length, and is by far the largest telescope ever formed—was instrument constructed, under his lordship's personal superintendence. As was expected, it was found to possess a far greater amount of space-penetrating power than any previous telescope. By means of it Lord Rosse has succeeded in resolving the nebulae which had remained hitherto resolvable only by the naked eye. Besides showing that these hitherto unresolved nebulae were wholly composed of stars, Lord Rosse's telescope disclosed many unexpected peculiarities of structure—as, for example, a very remarkable but well defined spiral arrangement—in several nebulae; a new family of nebulae, &c. as a result of these investigations. The device was, indeed, that it took the author nearly nine years to digest them and prepare the results for publication in a regular form.

The researches of the celebrated Sir John Herschel on the teaching of language, and the results for publication in a regular form.

We may perhaps not unaptly conclude this sketch by a brief allusion to a few of the labours of Mr. Airy at the Royal Observatory. We have already dwelt at some length on the great improvements that have been made in the science of the heavens and in new instruments of greatly increased power, and of the most refined character, have been introduced. The yearly observations are published in a form and with a regularity never before attempted. He has also procured the reduction under his own superintendence of the Greenwich Lunar Observations from 1760 to 1830, and the uniform reduction of all the Observations of the Planets made at Greenwich during the same period—works of enormous labour, but of inestimable importance—the former of which was published in two large quarto volumes in 1846, the latter in a very thin one in 1846.

Telescope. He also introduced and perfected, in a series of elaborate experiments, the method, first practised in America, of determining the longitudes of distant places by direction and time of transit; the ephemeris. By these means he successfully determined the longitudes of the principal observatories in the British Islands and on the Continent; and he in like manner connected the observatory with Deal, and with many other maritime and inland stations, so as to make the whole system one continuous one. And, in the last volume of the Greenwich Nautical Almanac, the true Greenwich mean-time for maritime and other purposes.

We ought also perhaps to notice that, among other works of M. Le Verrier, which he published under the direction of M. Dumas, and which was reprinted in the latter in a very thin one in 1846, the latter in a very thin one in 1846. He also introduced and perfected, in a series of elaborate experiments, the method, first practised in America, of determining the longitudes of distant places by direction and time of transit; the ephemeris. By these means he successfully determined the longitudes of the principal observatories in the British Islands and on the Continent; and he in like manner connected the observatory with Deal, and with many other maritime and inland stations, so as to make the whole system one continuous one. And, in the last volume of the Greenwich Nautical Almanac, the true Greenwich mean-time for maritime and other purposes.

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URUGUAY

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UTAH

USES, CHARITABLE AND SUPERSTITIOUS.

[Thurso.]

USURY. Although the legitimacy of interest upon moderate and conscienfious terms has long been recognised amongst us, it has, until quite recently, been believed desirable to regulate by law the rate at which it should be taken, and the amount of it that could be allowed. It has now been stigmatised with the odious appellation of usury. [In-

terest, vol. ii. p. 506.] It has been reserved for our own time to carry out a principle which political economists have preached for a century, that of permitting the rate of interest to regulate itself in accordance with the exigencies of the time and the nature of things. The first statute by which some relaxation of the usury laws was made in favof trade, was the 3 & 4 William iv. c. 98, which enacted, that no person taking more than the rate of legal interest for the loan of money on any bill or note not having more than three months to run, should be subject to any penalty or forfeiture. Shortly afterwards the statutes 6 & 7 William iv. c. 41, enacted that bills or other securities should not be void as a higher rate of interest than was allowed by the statute of 12 Anne had been received thereon. The statute 1 Vict. c. 90, next enacted, that bills payable within 12 months, should not for a limited time be liable to the usury laws, and this statute was followed by six others, of which the last (of 9 & 10 Vict. c. 24) preserved the principle of the act. The statutes 2 & 3 Vict. c. 37, enacted that no bill or note, payable within twelve months after date, or not bearing more than twelve months to run, nor any contract the loan of money at a rate of interest higher than that customarily taken thereon or secured thereby, or any agreement to buy or receive or allow interest in discounting, negotiating, or transferring any such bill or note, be void, nor any person so lending be liable to the penalties of the usury laws; but it ordered, that in all cases of usury, the money, or such part thereof as should bear interest at a rate higher than the rate of legal interest, should be recoverable as a penalty for the breach of the contract. The natural laws which regulate the terms on which money can be borrowed are therefore now left to operate freely, and borrowers and lenders are amenable to no other rules than those which govern contracts in general.


UTAH, a Territory of the United States of North America, lying between the 47th and 42nd N. lat., and 109th and 110th W. Long. It is bounded S. and E. by the Territory of New Mexico; N. by the Territories of Kansas and Nebraska; N. by that of Oregon; and W. and S.W. by the State of California. The area of Utah is estimated by the 'Topographical Bureau of the United States,' at 269,710 square miles. The population in 1850 was 11,380 (of whom 24 were free coloured persons, and 26 slaves on route to California), or 0.04 to the square mile: but this does not include the native Indian population, who were estimated by the Commissioner of Indian Affairs in 1853 at 11,500.

Surface, Hydrography, &c.—The Territory of Utah occupies for the most part a vast broken depression, known as the Great Basin, which lies between the Rocky Mountains in the north and east, and the Cordilleran range in the west; these lofty mountains rising in parts above the line of perpetual snow, while across them are only a few difficult passes. On the north of the Great Basin there is no continuous mountain chain, the watershed being formed by an elevated tract of them, known as the Uinta range, which slopes from the west to the east the rocky barrier is broken through by the head streams of the Colorado, the only river which finds its way out of the Great Basin; all the others which flow into the basin from the north and southeast being lost in the plains or in the lakes which occupy the bottom of the basins. The Great Basin is about 500 miles long, from east to west, and little less wide, and some 4000 feet above the level of the sea. Parallel to the main range of the Sierra Nevada and the Rocky Mountains are several inferior ranges, of which the Washbunt Mountains on the east are the most important.

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useful class, and with the facilities for internal communication afforded by the Uruguay, it is the natural entrepôt of the commerce of a vast region of the interior; while its own fertile soil and healthy climate would alone render it, in the hands of a peaceful and industrious people, a great exporting country. At present the trade is chiefly centred in Montevideo. The exports consist almost wholly of the produce of the hedges, as hides, horns, hair, jerked and salted beef, tallow, &c., and do not now probably exceed 1,000,000,000 sterling annually. The imports are chiefly of articles of British and colonial manufactures, &c., and of North America and the East Indies, of considerable but fluctuating trade between Uruguay and Brazil, the Argentine Provinces, &c. The exports of British goods in 1853 amounted to 529,858l. The exports to the United States in 1853 amounted to 308,280 dollars; the imports to 308,446 dollars.

Uruguay is a republic with an elective president, a senate, and a house of representatives; but the actual power is generally centred in the president, who is usually some successful general. The country is divided into nine departements—Montevideo, Maldonado, Canelones, San José, Soriano, Paysandú, Durango, and Cerro Largo.

Montevideo is the political capital, the commercial metropolis, and the largest and most populous city of the republic, and is situated on the eastern side of the river, opposite the town of Maldonado, with a fine barbour, good fortifications, and about 3000 inhabitants: it exports hides and copper. Colonia del Sacramento is a small town, with a harbour, opposite Buenos Ayres. None of the other towns are of any importance.

The Banda Oriental was, during the Spanish supremacy, the name of that portion of the vice-royalty of Buenos Ayres which was situated to the east of the river Uruguay, and was occupied by the Portuguese, and the country called the Seven Missions. The continual civil wars by which the declaration of independence was followed in Buenos Ayres, induced the government of Brazil to take possession of the Banda Oriental in 1815. The republic of Uruguay was formed, and a settlement could be made, a war ensued between the two countries in 1825. Through the intervention of the English government a treaty of peace was concluded in 1826, by which the northern district known as the Seven Missions was ceded to Brazil, and the more exclusive southern district was declared an independent republic under the title of Republica del Uruguay Oriental. But instead of securing peace to the country its independence appears hitherto to have only served to diminish its prosperity; hostilities have been almost of every year period, and this was soon followed by the incursion of troops from Buenos Ayres; the assistance of Rosas, the president of Buenos Ayres, having been invoked by Arieu, one of the unsuccessful aspirants to the rulership of Uruguay. Without the help of the latter party securing a manifest superiority, Brazil was induced by the appeals of Paraguay and other neighboring powers to interfere. In order to show her good faith, Brazil sent ministers to the courts of England and France, with a view to obtain their assistance either as umpires or active agents in compelling the respective parties to come to terms. Those powers accordingly sent some ships of war to the Rio de la Plata in 1845. The English ships blockaded Montevideo till 1846 and the French till 1846, when both England and France receded, and Rosas was soon after deposed in Buenos Ayres. Treaties between the several parties gave peace to Uruguay as far as regarded hostilities with foreign powers, and secured the recognition of the republic by the neighbouring states. But internal discord in the Java party, and the more restless manners of Jacobean Pedro, who for some time resided at Asuncion, led to the loss of the capital, and consequently the fall of the government. On the accession of the new party, Juan Manuel Rosas, the Paraguay was retained and it proceeded to treat with the Paraguay an act of dimensions of Canelones, &c.

URUY. [Chemistry, s. d.]
of the several secondary chains attains an elevation of from 2000 to 3000 feet; and from these diverge cross ridges, which form the main range of the Great Basin. A large section of the basin consists of arid plains, on which artemisias and salicarias are almost the only plants, but in many parts these plains are so impregnated with salt as to be unfit to sustain vegetable life. The most remarkable features of this singular region are the great valleys which are formed in the narrow portions of the range between the mountains of the high country and the bordering mountain range. The valleys of the Wasatch Range are generally confined to a coarse granular sandstone. In some localities the sandstones are overlaid with a coarse conglomerate, which is sometimes partly altered so as to assume the character of a grit or rock. Cretaceous strata of the Lower and Middle Cretaceous are overlaid with clay or marl. Good building-stones are quarried in the vicinity of Salt Lake City. Of the mineral wealth of Utah little is really known. The most important is that of coal and bituminous iron. But the most remarkable is the Great Salt Lake, which is situated in the lowland between the ranges of mountains, and is generally covered with saline water. It is the largest salt lake in the world, and is the continuous source of the Mississippi River. It is a huge lake, with an area of about 2,500 square miles, and a maximum depth of about 20 feet. The lake is fed by several rivers, the principal of which is the Snake River, which flows through the state of Idaho and empties into the lake from the west. The lake is saline, with a salinity of about 25 parts per thousand. The lake is surrounded by a wide belt of salt flats, which extend for several miles inland. The lake is the headquarters of many migratory birds, and is an important wintering ground for many species. The lake is also a source of salt, which is mined on the shores of the lake. The lake is also a source of potash, which is used in the manufacture of glass and other products.
Utah

Utah from its insolated situation must be to a great extent brown upon its own resources, if the peculiarities of its population did not cherish by every means their separate self-dependent condition. Cut off by lofty and difficult mountains from all commerce with agricultural resources little more than sufficient for the supply of its own increasing requirements, and without any staple product or material required by the arts or luxuries of civilized life, it is most likely to have any considerable amount of external trade or commerce; while there will probably be a sufficient stimulus to the growth of such manufactures as are required for ordinary domestic purposes.

With California regular communication is maintained, but only by the most organized and elaborate system of trade, and the produce of Utah. On the other hand, from Salt Lake City to St. Louis, the nearest considerable market, is upwards of 1600 miles. Some modification would undoubtedly be required in order to meet the requirements of those who are not in the habit of traveling. It was not till July of the following year that the first section of the pioneers reached the promised land. The remainder were soon to follow; for although the authorities had engaged to stay in Nauvoo till apprised of the safe arrival of the first missionaries, their old opponents came down, and drove them all out of the city in September 1846.

On taking possession of the site of their new city by the Great Salt Lake, the elders at once set about raising regular government, at the head of which they placed their prophet Brigham Young; and as soon as what they deemed a sufficient number of their followers had arrived, and their territory had become by cession from Mexico a part of the United States, they elected the usual state-officers, and to the federal government to be admitted into the Union as a sovereign state under the name of the State of Deseret. But Congress refused their application, and remanded the state back to a territorial condition, naming it Utah. Brigham Young was however appointed or continued as governor; and the community, though nominally under the laws of the Union, remained virtually independent, and governed by the maxims of the Mormon leaders. In 1856, however, Young, who had appointed a 'Gentile' governor, and the federal government assumed a more direct control. This led to disputes, and at length the federal judges were expelled, and the governor was forced to resign, and the two governments were content to be separate, each so living under a patriarchal dispensation, with prophets, elders, and apostles, who have the rule in temporal as well as religious matters; their doctrines being embodied in the 'Book of Mormon' and the 'Book of Doctrine and Covenants,' revealed to their first prophet, Joseph Smith; that they look for a literal gathering of Israel in this western land; and that here Christ will reign personally for a millennium, when the earth will be restored to its para-}

established in Nauvoo by some opponents of the sect, having published certain scandalous statements respecting him, the town council directed its publication to be stopped and the office to be rased. The editors appealed to the mayor of the city for a warrant against John Smith and his brother. Smith at first refused to obey, and placed the city in a state of defence; but he was induced to surrender in order to prevent a collision between his followers and the community, and to make a pledge of protection from the populace. A mob was however permitted to break into the state jail and murder both Smith and his brother. The Mormons elected a new prophet, Brigham Young, as the successor of Smith, and affairs again became prosperous. Several times the federal government tried to length regularly invested it; and the leaders were forced to undertake that the whole body should entirely quit the state. The prophet and elders now formed the bold resolution to follow their leaders across the vast western wilderness, to the far distant and nearly unknown country lying beyond the Rocky Mountains—there to seek some secluded retreat beyond the reach of their persecutors. They had been promised to be allowed till the spring to make their preparations for the departure of the first or pioneer party; but their enemies became clamorous, and they were obliged to set out in February 1846, while it was yet winter. The sufferings of this pioneer party were of the most terrible and trying kind; but they struggled on resolutely, planting crops, and other things as far as their resources would allow. It was not till July of the following year that the first section of the pioneers reached the promised land. The remainder were soon to follow; for although the authorities had engaged to stay in Nauvoo till apprised of the safe arrival of the first missionaries, their old opponents came down, and drove them all out of the city in September 1846.

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As we did not notice Nauvoo under Illinois, we may add
to what we have said of it above, that it stands on the Mississippi, 125 miles N.N.W. from Springfield; and that after the departure of the Mormons, Nauvoo became the seat of a colony of French communists, or Icarians, under the direction of M. Cabot, who were however far from successful. Of this there is no trace now. The population has dwindled down to a very insignificant number. The great Mormon temple of Nauvoo was, in October 1846, set on fire by an incendiary and destroyed.

(Captain Howard Stansbury, Topographical Engineers, U.S. Army, to the Far West Great Sioux Expedition, of Utah; Fremont, Report of Expedition to the Rocky Mountains; Lient. J. W. Gunnison, The Mormons, &c.; Statistical View of the United States; Seventh Census of the United States, &c.)

UVAROV, SERGY S EMENOVICH, or OUVAROFF, as the name is written in French, an eminent Russian statesman and author, was born about 1783 of a noble family, and received his Christian name from the Empress Catharine, to whom his father was aide-de-camp. He studied at Göttingen, and in the year 1810 made his first appearance as an author in a Project for an Asiatic Academy, written in French and addressed to the Emperor Alexander, in which he proposed the foundation of a great institution for the study of the languages and literature of Asia. In the course of the year 1813, he was appointed, young as he was, to the curatorship of the university and educational establishments of the district of St. Petersburg, an important office which he discharged with great liberality of action. The Emperor, it is said, remarked in a Russian pamphlet, published at the conclusion of the great struggle in 1814, "is now preparing to emerge from chaos and to consolidate its foundations. A stupid tyranny will no longer oppose itself to the efforts of reason, and on the whole surface of the globe it will be permitted to think." When the Emperor Alexander's views became of a more retrograde character than they had been, Uvarov, after vain offering the introduction of some new regulations relating to education, retired, in 1821, from his curatorship but still retained the post of president of the Academy of Sciences which had been conferred on him in 1816. In the following year he became director of the department of manufactures and internal commerce, and he was subsequently for some years minister of finances. That his influence was not extinct was proved by his being able to establish in 1823 an institution for the instruction of young diplomats in the Oriental languages, carrying out in some degree his early project. After the accession of the Emperor Nicholas he was in 1825 made inspector of Public Instruction, a step which excited some surprise, as the tendencies of the new government were certainly not in favour of permitting the liberty to think. From that time till 1846 Uvarov occupied himself actively in founding museums, botanical gardens, observatories, and educational institutions; and in providing for the better endowment of such establishments, and any deficiency in liberality in their management was attributed rather to the emperor than the minister. In 1846 he again retired from office on occasion of some restraints on education being imposed, of which he did not approve.

The principal writings of Uvarov are rather elegant than profound; they are collected in two volumes, one bearing the title of 'Studies of Philosophy and Criticism,' and the other 'Political and Literary Sketches' ('Études de Philologie et de Critique,' St. Petersburg, 1843, 2nd edition, Paris, 1845; 'Essais politiques et litteraires,' Paris, 1846). All of these essays are in French, except two on philological subjects, one on the poet Nunnus of Panopolis, and the other 'On the Ante-Homeric Age,' which are in German. In the preface to the essay on Nunnus, addressed to Göthe, the author expresses an opinion that it is now time for every author to choose for his instrument the language which is best suited to the circle of ideas he intends to treat." He seems however, in spite of the confidence of his tone, to have been for some time in doubt as to venturing to print in German and before publishing his essay for this last purpose he asks for advice. The tone replied "Never confide to any German the grammatical revision of your manuscripts. Do not forfeit the immense advantage you enjoy in not knowing German grammar; I have been trying to forget it these thirty years." Among the few foreigners who have written in that language, Uvarov is admitted to have been one of the most successful. In French, which was in the time of his youth more familiar to him, he composed the 'Letters to the French,' to be perfectly idiomatic by his French editor M. Léonard Leduc, who in his amusing preface declares with apparent confidence in his own correctness that "everywhere our novels, our plays, our books, whether serious or frivolous, are composed in French." Some of his other essays 'Stein and Pozzo di Borgo,' 'The Prince de Ligne,' 'Venice,' 'rome,' &c., are in themselves of interest and are treated in a light and graceful style which never fatigues the reader. Uvarov is reported to have written memoirs on his own time, which may probably form the best portion of his writings in the eyes of posterity.

UWINS, THOMAS, R.A., was born in Pentonville, London, in 1753. Apprenticed to Smith, an engraver of some repute in his day, he acquired, whilst learning the use of the burin, a certain familiarity with the general principles of design. But having fixed his heart on becoming a painter, he, on quitting Smith, entered as a student at the Royal Academy, at the same time availing himself of the lectures of Sir Joshua Reynolds, in which he was much interested. For some years he was principally occupied in making designs for book engravings, in which he seems to have taken Stothard as his model, though maintaining considerable originality; and in the course of his career he very decidedly power as well as grace. He also made some numerous copies of paintings for the use of engravers. At this time he practised almost exclusively in water-colours, and in 1811 he was elected a member (and subsequently secretary) of the Society of Painters in Water-Colours. Failure of health having led to a temporary abandonment of his profession, he after a short interval commenced practice in Edinburgh as a portrait painter, having prepared himself by making a series of portraits for book illustrations. In 1813 he visited Italy, and the studies he made during his stay led him to commence painting pictures illustrative of the cheerful outdoor life of the Italian and especially of the Neapolitan peasantry. These works painted with a light bright pencil, picturesque in costume, gay in colour, and cheerful in spirit, became at once popular, and their popularity remained undiminished as long as he continued to produce them. As samples of these sunny Italian pictures may be mentioned, "The Mandolins; Dressing for the Festa; Neapolitan Peasants" from his diploma for the Academy of St. Luke at Naples; "Interior of a Saint Maunufact at Naples;" "Festa della Madonna del Arco;" "Loggia of a Vine-dressers cottage in the afternoon of a Saint-day;" "Mountaineers at the Festa of June;" "Teaching a Child the Tarantella;" "Children asleep in a Vineyard;" "Making a Nun." He also painted some English pleasant pieces, as "The Top of the Stule," "The Pet of the Village," &c., but with less success. Later he painted illustrations from popular authors, such as "Don Quixote," "Dorothes;" &c., and still later he essayed a lighter class of subjects, as "Lear and Cordelia in Prison;" "Cupid and Psyche" (painted for Prince Albert); Psyche rescued from the infernal Regions with the Casket of Beauty; 'The Reproof;' "John the Baptist receiving the Messiah as a Child on the Morning after the Baptism;" "Judas;" &c., but these were scarcely adapted to his pencil. Mr. Uwins was elected a Royal Academician in 1836; and from 1844 to 1855 he held the office of librarian to the Royal Academy. He was the appointed keeper of her Majesty's pictures in 1849, and keeper of the National Gallery in 1847, but he resigned the latter situation after two or three years. He died Aug. 25, 1857, at Staines, in Middlesex. In the Vernon collection are two etchings by Mr. Uwins, "The Vineyard in the Claret Vineyards, South of France," and 'Le Chapeau de Brigard;' in the Shepshanks' collection are four more characteristic examples of his pencil—"Italian Mother teaching her Child to Swim;" "A Half Noon Scene at sea;" "Among the Icarians;" The tavoletto Shepherd; &c., and 'Suspicion.'
VALENTIA, HARBOUR OF. [Keray.]

VALERY. [Chemistry, 3. 2.]

VALLEJO. [California, 9. 2.]

VALEYS, LILY. [This, a common name for the Cowslip, sec. 11.]

This plant is too well known to need description. The genus _Convolvulus_, a bell-shaped 6-petalled deciduous perennial; a 3-celled 2-ovuled ovary; a bunt trigonous stigmas; berry with 1-seeded cells; flowers joyous to see. -_C. majalis_, the Lily of the Valley, is a foot high, with two ovate-lanceolate radical leaves. The flowers are racemose, nodding, pure white, globose, bell-shaped, and fragrant.

VAN DIEMEN'S LAND. [Tasmania, 9. 2.]

VANCOUVER ISLAND (or the Victoria Archipelago) lies off the western coast of North America in the North Pacific. It is long and narrow, extending in a direction from south-east 48° 34' to north-west 50° 3' N. lat., and between 122° and 129° W. long., the length being about 2,600 miles, the average width 60 miles. It is overlapped at its southern end by the continental cape of Prince Alexander. Between it and the Strait of Juan de Fuca, five leagues wide, is an entrance running in a east-south-east direction for about 100 miles, widening in several places, containing several bays and sounds, and forming several arms on the continental shore; these, suddenly narrowing, turning northward through an archipelago of small islands, called the Arro Archipelago, thence widening into the Gulf of Georgia, which is the channel through Johnstone's Strait into Queen Charlotte's Sound. Vancouver first discovered this passage in 1792. There are many bays and harbours all round the island. Three islands of the Arro group are separated from the coast of Vancouver Island by sounds supplied with water. The island is sparsely inhabited, and consists of two-thirds of Vancouver Island. At the southern end the settlement of Victoria has been formed, on a harbour termed Camosack, safe and easily accessible for vessels, but having the drawback of being rocky. Vancouver Island contains valuable coal deposits, and several good harbours of considerable depth; but the whole does not extend more than 200 miles.

Nootka Sound, Clayquot, Nininat, all on the western coast. The shores of the island present an alternation of rocky cliffs and sandy beaches. At no great distance from the sea is a compact mass of rugged mountains, whose summits are misted with water clouds. The island is not a considerable quantity of fertile land, covered with good natural grass. There are numerous small tribes of Indians on the island, of whom some have been found of a friendly disposition. The possession of Nootka Sound had nearly given rise to a war with Spain, who claimed it, and had expelled some English settlers from Nootka, but it was at length resigned to England, and has since continued in their hands. Vancouver Island was made over in 1846 to the Hudson's Bay Company by a charter, on condition that they should colonize it; the government reserving the right to reclaim possession of the island for Great Britain within a specified time.

North of Queen Charlotte's Sound lies Queen Charlotte's Islands, between 58° and 54° N. lat. The group consists of three islands extending about 150 miles in length, by about 90 miles in breadth. In these islands are several excellent harbours. At Mitchell Harbour, on the middle island, and at other spots, gold has been found, embedded in quartz sand. The island is supplied with water by several excellent springs. The interior of the islands is hilly and well wooded, the climate is healthy, and the soil remarkably fertile. The islands contain several beds of coal, and several fine specimens of lead and copper have been obtained. At Nimpkish, on the north coast of the same island, there are extensive ranges of white and black coal, and coal has been obtained as far north as the 58th parallel. The entrance of the bay is formed by two steep rocky capes (Galata and Hodrova, or Suganlik), 84 miles sandery. The shores sink gradually to the head of the bay, where in the neighbourhood of the city they are level. The Paravati River (the ancient _Lupara_), which rises in the Salish near Shumla, after traversing the two lakes of Devne, discharges itself by a broad stream into the Black Sea, along the foot of the southern walls of Varna. The distance between the eastern shore of the lake of Devne and the Black Sea is little more than half a mile. It has been in communication with the Black Sea by a narrow river, which supplied the city with fresh water. The two lakes of Devne, between the Black Sea and the eastern shore of the lake, are little more than half a mile.

Varna is a wretchedly built town, surrounded by old stone walls and a dry ditch. It is a place of considerable trade, the exports of corn, barley, tallow, eggs, and other Bulgarian produce, amount in value to about 600,000. Austrian steamers between Constantinople and Galata put in at Varna. Under the walls of Varna the Sultan Murad II. in 1444 defeated the Hungarians under King Ladislas (nearly 80,000 men) and John Huniades. The Hungarians took Varna in 1826. The Anglo-French army encamped in Varna and its environs in the summer of 1854, previous to its embarkation for the Crimea.

VARNA. [Tanaceto.]

VENCE. FACIUS. This writ, and also the other writs referred to under this head (vol. xxvi., p. 214), the _disgraces_ and _habeas corpora juratorum_, have been in effect abolished by the Common Law Procedure Act, 1853; which also enacts that the order of procedure and the punishment of contempt shall be by an order of court, and not by the ordinary procedure of the Court of Arches. The _Commentaries_, Mr. Kerr's ed., vol. iii., p. 380.]

VENUS FLY-TRAP. [Dionaea.]

VERNAL GRASS, SWEET. [Anthozoanthum.]

VERNON, ROBERT. Though possessing technically no title to an entry being named in the Register of the National Gallery of British Art, Mr. Vernon claims an honourable place in this work. The so-called 'National Gallery' of paintings was founded in 1834 by the purchase by Lord Liverpool's government of the collection formed by Mr. Angerstein. This collection included nine pictures by British painters—the 'Marriage à-la-Mode' of Hogarth; that painter's portrait; Lord Heathfield by Sir Joshua Reynolds; and Wilkie's 'Village Festival.' In the course of the next twenty-three years there were occasional bequests or presentations of English pictures, but not a single English picture was added to the national collection by purchase: the entire number of British pictures in the National Gallery in 1847 was only forty-one, and several of these were portraits of unknown or insignificant persons by second-rate artists, or works of little artistic excellence or general interest. In every other country the possession of worthy specimens of the pens of the chief painters of that country had been deemed the essential feature of a national collection; here the National Gallery, according to the official estimate, was to be a gallery of the works of the 'Old Masters' of Italy and Holland.

It is to Mr. Vernon that the country is primarily indebted for what has been done towards placing matters on a more rational and satisfactory footing. Born in 1774, he by diligence, perseverance, and skill, during a long commercial career, raised himself from very humble to very affluence circumstances; earning at the same time a high character for honesty, zeal, and humanity in his intercourse with the public. Having a great fondness for pictures, he began, as soon as his means permitted, to indulge his inclination by purchasing some; and following his own taste he selected the works of English artists. In the course of time he was enabled to buy till every room in his house was filled. He now conceived the design of presenting his pictures to the nation, in the hope that if kept together they might serve as the nucleus of a gallery of British art. With this view he sold such of his pictures as he deemed undeserving of such a destiny, and purchased or commissioned (in nearly every instance direct from the painter) fresh examples of the masters he most
admirer, then—not waiting to make it a posthumous gift—he offered his collection to the government, requesting that all those pictures might be selected which were considered worthy of national acceptance; and that being done, he made them over by a deed of gift, dated December the 22nd, 1847, to the Trustees of the National Gallery. The collection so transferred comprised 157 pictures, all but two by British artists, and all of the highest proportion by living artists. The pictures having been selected in the first instance for a private residence of moderate dimensions, are mostly of cabinet size, and to a considerable extent of homely subjects; but they include favorable specimens of a large proportion of the chief disciples, and of English youth, like Mr. Vernon lived long enough to see that his munificent gift was warmly appreciated by the great bulk of his countrymen; but not to see it provided with a fitting repository. He died May 32nd, 1849. Since his decease the Vernon collections have formed a temporary resting place in Marlborough House. To it has been added the splendid bequest of Mr. Turner (Turrans, J. M. W., S. 2); and Mr. Sheepshanks has also presented to the nation his noble collection of 233 paintings in oil by English artists; but his gift is clogged with stipulations as to the place where they are to be deposited, which prevent them from being—for the present at least—placed along with the Vernon and Turner pictures. It is however greatly to be desired that some arrangement may be made by which these collections may be brought together, and thus form the commencement of a National Collection of British Art worthy of the nation.

A marble bust of Mr. Vernon, purchased by subscription, is placed in the hall at Marlborough House; where also is a marble group by Gibson of Hylas and the Nymphs, and about half a dozen marble busts, presented with his pictures by Mr. Vernon—the somewhat sorry commencement of a National Collection of the works of British Sculptors.

VERTEBRA is the name given to each of the separate bones of which the spinal column of the skeleton of the Mammalia is composed. [Skeleton.] Although in technical anatomy the term is thus restricted, it has recently received a much more extended signification. Professor Owen defines a vertebra as "one of those segments of the endo-skeleton which constitute the axis of the body and the protecting canals of the nervous and vascular trunk; such a segment may also support diverging appendages. According to this definition, the vertebra becomes the type or plan on which all the bones of the skeleton of vertebrate animals are constructed. It is not only a portion of the spinal column, but the elementary form to which all the parts of the skeleton may be reduced. The bones of the head, of the thorax, of the pelvis, and the limbs, however complicated, are reducible to the plan of the typical vertebra. In the history of the development of this interesting branch of anatomical inquiry a variety of opinions have been expressed, as to what may be regarded as the most important elements of a typical vertebra, since in no instance do we find all the parts of the vertebra developed in exactly the same manner.

The diagram exhibits a typical vertebra, according to the plan of Professor Owen.

This plan does not include the parts which constitute the diverging appendages. Of this plan Professor Owen says, "The names printed in Roman type signify those parts which are derived, in the same manner, from distinct and independent centres, I have termed 'autogenous' elements. The italic denotes the parts more properly called processes, which shoot out as continuations from some of the preceding elements, and are termed 'exogenous', e.g., the diapophyses, the upper extremity of the transverse process, and the hyopophyses or the 'after-born' or 'artificial processes' of human anatomy."

The autogenous processes generally circumscribe holes about the centrum, which in the chain of vertebras form canals. The most constant and extensive canal is that formed by the centrum and the adjoining portions of the lobed or pedunculated vertebra, and is called the vertebral canal, or spinal canal. This canal communicates with the brain by a passage in the cranium, and with the body of the vertebra by a passage in the spinous process, and in the pedicles. It is bounded by the centrum, and marked C. in the diagram. The second canal is formed by the hemapophyses, and is below the centrum, and embraces the central circulating organs (A), the heart, and the large trunks of the vascular system. At the corresponding level in the lower vertebras, in that region, rise two other canals, formed by the three lateral elements of the vertebrae, and these often embrace an artery and a nerve. Thus a typical or perfect vertebra, with all its processes, has formed a central point of common centre such a vertebra is seen in the thorax of man, and most of the higher forms of vertebrate animals, as in the neck of many birds. In the tails of most reptiles and Mammalia the hemapophyses are articulated or anchored to the under part of the centrum being needed there only for the caudal artery and vein. But where the heart is to be lodged an expansion of the hemal arch takes place, analogous to that which occurs in the neural arches when the nervous trunk arises from these arches. In the vertebrae the lower part of the thorax, spinal column, and skull, may be traced to the elements above referred to, the parts of the two pairs of locomotive organs which all vertebrate animals are endowed may be traced also to the same arches. And the diverging and complexing of all others are most subject to change,—now developed to an enormous extent, and again almost entirely disappearing, according to the necessity of adapting the animal to its special habits. With the exception of the posterior and anterior extremities, these organs of the skull are to a limited degree. It is through the study of these appendages that the pectoral fins are seen to be the homologues of the anterior extremities in the reptiles, of the wings in the Birds, of the flippers of Seals and Whales, and of the limbs in Man. In like manner the abdominal fins of Fishes are the homologues of the legs in Birds, and of the posterior extremities of the Reptiles and Mammalia, and the legs in Man. These homologues include not only the totality of these organs, but the individual parts, and the scapula, clavicle, coracoid process, humerus, radius, ulna, carpal and metacarpal bones, and phalanges, in the higher Mammalia and Man have their homologues in the lower form of vertebrate animals. So well does the creature agree with its illumined place, that the femur, fibula, tibia, tarsal and metatarsal bones, and phalanges.

We have no space here to enter into the details of the application of this general plan to the structure of the skeleton, and this only on the hypothesis that this has been done in a most masterly manner by Professor Owen, in his 'Report on the Homologies of the Vertebrae Skeleton,' published in the 'Transactions of the British Association' for 1846, and also subsequently in an independent volume devoted to the same subject. This department of anatomy, inquiry is no longer a matter of ingenious hypothesis and verbal speculation, but has been placed by this inquirer, through the unerring principles of comparative anatomy and development, upon the firmest basis, and may be regarded as an essential part of scientific truth.

VIC0, FRANCESCO DE, one of the most distinguished astronomers of modern Italy, the son of Count Ascacio de Vico-Ubaldini and the Countess Amalia Archinto, was born at Milan on the 15th of November 1780. He was educated partly at the College degli Nobili in Urbino, partly in the school of the well-known congregation of the Scolopi at Siena, and entered the Jesuit Society as a novice in 1823. After passing with much distinction through the usual stages, both in the classics and in the sciences, he was appointed, in 1830, as professor of the first duties assigned to him was to calculate the time of the appearance of the then expected Halley's comet, both according to the elements of Damoiseau and to those of Pontecoulant. The young astronomer had the satisfaction of being the first to observe the comet, on the 8th of August 1835. Soon afterwards, D'Arca, in consequence of the great age of S. Dumonchel, becoming
the principal astronomer of the Roman observatory, under-
took a long series of observations for the purpose of ascer-
taining the suspected error in the latitude of Rome, as
determined by his illustrious predecessors, Boscovich, Calan-
drelli, Cassini, and Flamsteed. These observations, which
amounted to nearly 8000 in number, were remarkably ac-
curate, and the result was a correction of an error of two
seconds in the received latitude. He engaged at the same
time on a similar series of observations for the longitude, in
connexion with which he would search the heavens for 10, 1847.
Father afterwards, Father De Vico, at the instance of Schumacher
of Altona, undertook a course of observations of the planet
Venus, for which the clearness of the Roman atmosphere
was peculiarly adapted, with a view to the determination of the
perihelion, and that makes as well as the other observations
this undertaking contributed more than all his previous
labors to establish his reputation among the astronomers of
Europe; and his subsequent observations of the satellites of
Saturn, and of the inner ring of that planet, as well as his
detailed reports on the nebulae, which about that time had
become a prominent subject of interest, fully sustained that
reputation.

Father De Vico however is most popularly known as an
observer of the trans-Atlantic discoveries in the
cometary system, which he was one of the earliest in the most
recent times to take up as a systematic study. During the
years 1845, 1846, and 1847 he discovered no less than eight
of these mysterious bodies, in seven of which his claim to
priority was established. He was at once observed by another astronomer two days before it was dis-
covered (independently however) by Father De Vico.

Another more humble but hardly less useful work undertaken
by Father De Vico was the preparation of a new system of astronomical maps and charts, in which he is said
to have made considerable progress; but in this and other
works which he had commenced, he was interrupted by the
Revolution of 1848, by which, in common with the other
members of his order, he was expelled from Rome. He was
thereafter treated with much distinction during his exile by his fellow-
astronomers in France and England, and received more than
one invitation to fix his residence in either of those countries;
but the circumstances of his order at that time determined him
not to accept any of these offers. He continued to entertain
the hope of returning to Italy, and in 1850, at the age of forty-three.

Father De Vico is chiefly known in literature by his contributions to the 'Raccolta Scientifica,' a scientific
journal which owed its origin principally to himself, and
which is still continued under a new form.

[In 'La Vita e ai Lavori del P. Francesco
De Vico, Rome, 1861.]

VICTORIA, ALEXANDRINA, Queen of the United
Kingdom of Great Britain and Ireland. [In the 'Penny
Cyclopedia,' the history of the Kingdom is briefly given
under the names of the respective Sovereigns; and that
history is brought up to the accession of our present Queen.
In this historical point of view, and not as the biography of
a living personage, we continue the series of Monarchs, but upon
somewhat different a plan, as we shall presently explain.]

Queen Victoria, the only child of Edward, Duke of Kent,
the fourth son of George III., and of Maria Louisa Victoria,
a daughter of Francis, Duke of Saxe-Coburg Saalfeld, was
born at Kensington Palace, London, May 24, 1819. The
Duke of Kent had married in 1818, in Paris, Princess
Charlotte of Leiningen, afterwards Princess of Saxe-
Belgium, who was the widow of the Prince of Leiningen, on
whose death in 1814, she had been left the guardian of her
younger sons and the ruler of their territory, both which
duties she fulfilled with remarkable care and success.
The Duke of Kent died on January 23, 1820, leaving his widow
in charge of their infant daughter. On the accession of
Victoria to the throne on June 30, 1837, she found Lord
Melbourne at the head of the government, and she willingly
confided to him many of her private affairs. The Queen
was married to Prince Albert-Franz-August-Karl-
Emmanuel, the second son of Ernst-Anton-Karl-Ludwig,
Duke of Saxe-Coburg-Gotha. On November 21, 1840, the
Princely Royal was born, who was married, January 25,
1846, to a lady of the Roman Catholic Church.

On November 9, 1841, was born Albert Edward, Prince of
Wales: on April 25, 1843, Alice Maud Mary; and on August 6,
1844, Alfred Ernest Albert; on May 25, 1846, Helena
Augusta Victoria; on March 18, 1848, Louisa Caroline
Alberta; on May 1, 1850, Arthur William Patrick Albert;
and on April 7, 1853, Leopold George Duncan Albert; and on
April 14, 1857, Beatrice Mary Victoria Feodora.

We have considered it desirable, in the instance of our
present Queen, to quote from the accounts of all the
previous sovereigns which so completely belong to our own immediate times, to deviate from the
plan which has been pursued in the biographies of the
other English sovereigns. A connected historical sket-
ch of the events of the reign, with an enumeration of opinion;
and we therefore prefer to notice, in the dry form of a
terological abstract, the most prominent circumstances of the
past one and twenty years. The historian of this remarkable
period will point to it as an epoch of unparalleled progress in all
the various arts and sciences, and will be struck with
the steady advance of the most enlarged principles of
political action, without the slightest disturbance of that
respect for law and order, in the absence of which no acces-
sion of freedom could be permanent. He will mark a growth
of industrial prosperity so mighty and so rapid, that it could
only be accomplished by a people living under the stability
of a monarchy and the liberty of a representative government.
He will see the happiest development of the aim at an universal
landslide, so full to be ensured by all the States, but with an accelerated energy at every step, which gives
the hope that the inequalities in the condition of the people
may become far less onerous than in any previous period,
and eventually produce a community more united by com-
mon affection and interest, in which the well-being of the
people will be the cause, and the welfare upon the progress of the civilising Arts—how Music has
again become an enjoyment for all; how Painting has re-
ceived a more important impulse in the extension of taste,
than it ever derived from mere patronage; how the higher
branches of Art have come to the aid of manufactures,
if Literature has become less bold and original, it has
applied itself to the advancement of knowledge and
amusem. of a body of readers, who have increased tenfold since
the death of the Queen Victoria. We cannot open our
pages to record the growth of the domestic virtues; the
universal contempt with which the low indulgences of a former
generation are regarded; and with some differences upon minor
points of doctrine and ceremonial observance, how the great
religious principle which has so disting. Protestant
England prevails throughout the land in companionship
with that spirit of free inquiry, derived from our scientific
progress, from which truth has no reason to shrink. How
large a portion of the great characteristics of our time have
been derived from the influence of the personal character
of Queen Victoria, the future historian will feel it his duty
to set forth. It is impossible for any thinking man, who has
had the happiness to live under her benign rule, not to feel how
sincerely she has endeavoured to contribute to the welfare
of his country. It is a great feature of this reign, that
during seventeen years it was a reign without the excitement
of foreign warfare. A prince with martial propensities
might have been urged by such a country as ours to break
trans-Atlantic quarrels. But let it not be forgotten that,
when the sword was to be drawn in a just cause, a more
animating example was never presented than that derived
from the patriotic spirit of Victoria; and that the world
felt that, after forty years peace, Great Britain, under a
Queen, was as warlike as under the most chivalrous leader,
and far more just and considerate towards other nations,
than in the days when war was held the greatest glory. In
the chronological abstract which follows, will be found
the most interesting events which have come upon the great
characteristics of the reign of this queen. But there are others,
far more numerous, and some more important, which cannot be indicated in such a form.

We shall only attempt to offer an abstract of what
happens when he desires to know the date of some remarkable
occurrence which belongs to the public history of the period.
1837. June 20, Queen Victoria succeeded to the throne,
and was proclaimed on June 21. The Duke of Cumberland
was succeeded by his son, Prince Albert, Duke of Cambridge.
This prince was restricted to males, and thus the connection of
the royal family with the Continent was suspended after continuing for
133 years. July 6, William IV. was buried at Windsor.
November 20, the Queen in person opened the new parlia-
ment, and in an address delivered to both Houses, she
spoke of the war, and of the dangers which threatened the
United States in Canada. December 14, the Canadian rebels were de-
feated at St. Eastace in Lower Canada, their chiefs saving
themselves by flight. December 29, the American United


States steamboat Caroline, which had brought assistance to the rebels, was attacked and burned, on the territories of the United States.

1838. January 5, the Canadian insurgents, under Dr. Mackenzie, surround Toronto, but are repulsed by the governor, Sir Francis Hallow; and a proclamation of the President of the United States forbids the attacks of its citizens on neutral territory. January 10, the American government sells its claims on the British government for $325,000. May 1, the Chartist proclamation and the proclamation of the French government are burnt down. January 16, the Earl of Durham was appointed governor-general of her majesty's possessions in North America, with extraordinary powers, in order to effect a settlement of the difficulties there. May 23, the manufacture of Sir John Siners (which left April 4) and Great Westerns (April 6) steam-ships arrived at New York from England, being the first vessels which crossed the Atlantic by steam power alone. May 31, a junatic named Thom, who assumed the name of Sir John Parn reserved his half kingdom of Jerusalem, having excited a number of deluded followers against the Poor-Law Act, a contest ensued with the military near Gauterbury, and Thom having shot two men himself shot by one of the soldiers. June 20, the coronation of Queen Victoria, attended by Marshal Soult, the old opponent of the Duke of Wellington, as ambassador from the King of the French. July 31, the new Irish Poor Law and the International Copyright Acts were passed. On August 4, he struck the American ships andprechased an Irish Tithe Compositional Acts were passed. August 16, the Queen proclaimed parliament. On September 17, the London and Birmingham Railway was opened throughout its entire length. October 9, the Earl of Durham declared his intention to resign the government of Canada, in consequence of some of his proceedings being disapproved. November 1, the rebels were defeated at Napierville. On November 4, there were riots at Montreal. In November, intelligence was received that Dost-Ahmed Khan, the chief of Kabul, had joined Persia with an intention of attacking the British possessions in India, whereupon the governor-general had adopted the cause of Shah Soojah in his claims on the throne of Afghanistan. [AFGHANISTAN, 5.] November 26, the United States and Russia agreed to co-operate in the same, and the insurrection was wholly suppressed. December 12, a proclamation was issued against illegal Chartist assemblies, several of which had been held at night in various parts of the country, those attending them being armed with guns, pikes, &c.

1839. January 7, the Académie des Sciences at Paris made a report on the invention of M. Daguerre, the originator of the daguerreotype process, which has been found to be of considerable practical importance. The troops of the East India Company occupy Adua. May 6, the government having been defeated in the House of Commons on a bill for suspending the constitution of Jamaica, where the House of Assembly had refused to pass the measures for its complete abolition. September 7, the House of Commons, at the instance of the Lords, on the 7th, that the ministry had resigned. On the 8th, Sir Robert Peel received her Majesty's command to form an administration; but owing to the refusal of the Queen to dismiss the ladies of her household she declined the commission, and on the 10th Lord Melbourne was reinstated. June 8, ratification of the treaty for the separation of Holland from Belgium. June 14, the Designs Copyright Act passed. July 15, Chartist riot at Birmingham suppressed by the military, but not till a large amount of damage had been done. August 17, the Postage Act passed, enacting a uniform rate throughout the kingdom for all letters not exceeding half an ounce in weight, and it gave the Treasury the power of fixing the rate at first, though it was to be ultimately one penny. This was done by reducing all rates above 4d. to that sum, leaving all below 4d. unaltered. It came into operation on December 5; and on January 10, 1840 the uniform half-ounce rate was reduced to one penny. The Act was for one year only, but it was confirmed in 1844. November 4, Newport in Monmouthshire was attacked by a party of Chartists, estimated to number about 10,000 men, under the command of John Frost, an ex-magistrate. They were opposed by the mayor, Mr. Phillips, and a party of special constables, numbering about 200. The rioters broke the windows of houses, fired on the inmates, and the mayor was wounded; upon which the soldiers fired, made a sortie, and dispersed the mob, of whom about twenty were wounded. The next day Frost and some others of the leaders were apprehended; on December 31, they were tried, found guilty of high treason, and sentenced to death, but the punishment was commuted to transportation for life, and in 1856 a free pardon was granted to them. Government papers announce the termination of her hermitage marriage with Prince Albert. November 24, the trade between England and China was stopped by order of Lin, the Chinese imperial commissioner. 1840. January 11, a Chartist outbreak contemplated at Sheffield was quelled, and in Westmorland, some of the leaders being apprehended. Slight disturbances took place about this time also, in a few other towns of the North. January 16, parliament opened by the Queen, and Lord John Russell was again returned for Montreal. Lord Melbourne, who had brought an action against Hanard, the printer to the House, for a libel contained in some of the papers printed by order. He had obtained a verdict, issued execution, and the sheriffs of Middlesex had seized and sold some of Hanard's books. It had been charged that Hanard had sold books that were the subjects of breaches of privilege. At different times, and after considerable discussion, Stockdale, his attorney, the two sheriffs, and some subordinate agents, were committed to the custody of the sergeant-at-arms. A bill was subsequently thrown out, Lord John Russell, for exempting from such actions all papers ordered by the House to be printed, which was passed on April 14. February 10, the marriage of the Queen took place, attended with festivities throughout the country. April 16, the French government of the present year, note, complaining of the establishment of a monopoly of the trade in sulphur granted to a French company, in contravention of the treaties with England. As the Neapolitan government refused satisfaction, an English fleet was ordered to take possession of the island of Naples. November 28, the French government and the United States agreed to prevent all French hostilities, and the sulphur trade restored to its former course. May 6, the new stamps and envelopes for pre-paid letters came into use. June 4, the Act for better effecting The Combination in England and Wales received the royal assent. July 3, the fort of Amoy, in China, was destroyed by the English fleet, and on the 10th, the island of Chusan was taken. July 23, the Act for uniting the provinces of Upper and Lower Canada received the royal assent. September 7, the children to sweep chimneys, and on August 10, that for regulating Irish Municipal Corporations, received the royal assent. August 11, the parliament was prorogued. August 25, the Carlist insurrection in Spain having been suppressed, the Duke of Angouleme, as a mark of respect, visited Paris. December 5, Mehemet Ali, of Egypt, who had been for some time resisting the claims of the Sultan of Turkey to the sovereignty over Egypt, who had invaded and taken possession of the land ledge, was in England and France accepted on this day the terms proposed. Commodore Napier with an English fleet had greatly distinguished himself by his successful attacks on Beyrout and Acre. December 15, the remains of Napoleon Bona parte were deposited in the island of St. Helena; and on the 26th were this day deposited with great ceremony in the Hôtel des Invalides, having been brought to France by a French squadron under Prince de Joinville.

1841. January 9, a meeting of the Repeal Association was held in Dublin, to receive the accounts of the preceding year; and during the sping several monster Repeal meetings were held to hear the addresses of Daniel O'Connell, some of which were attended by as many as 150,000 persons. Jan. 9, the Bogue forts at Canton were attacked and taken by the British forces. January 30, after some further hostilities, the Chinese government proposed terms, by which Hong-Kong was ceded to Great Britain, direct official communications between the two powers granted, some additional ports opened to trade, and an indemnity of six millions of dollars paid. January 26, parliament commenced its sittings. Feb. 10, the union of the Canadas proclaimed at Montreal, and Lord Sydenham took the oath of office. February 15, a dispatch was given to the British consul at London, to celebrate the foundation of the most recent colony of Great Britain—New Zealand. On March 15, at a meeting of the Vice-Chancellor, heads of houses, and proctors, of the University of Oxford, a resolution was passed condemning the Puseyite revival in Oxford. March 21, the annual meeting of the Metropolitan Anti-Corn-Law Association was held, numerous meetings of similar object having been held in various parts of the
country. April 26, a meeting called by the Archbishop of Canterbury, in London, to raise funds for sending out bishops to New Zealand, was held. On the same day, the preliminary expedition of the second colony to New Zealand sailed under the command of Captain Wakefield; the colony to be formed on the principle proposed by E. G. Wakefield, limiting the area, and applying the revenues to the support of the clergy. May 18, a great meeting held at Manchester, to petition for a total repeal of the Corn-Laws. Many other meetings for the same purpose were held throughout the country, some of which were attended by petitions, and corporate for universal suffrage. May 23, hostilities re-commenced at Canton. The British forces, under Sir Hugh Gough, took two forts, and the town capitulated, having agreed to the previous terms and to pay six millions of dollars for the forts. June 27, the case of the seven ministers of the presbytery of Strathkoghe was brought before the assembly of the Scottish Church; when they were suspended for having obeyed the order of the civil courts in placing the minister of Marnoch against the order of the Assembly. A large minority protested, and a numerous meeting was held in Edinburgh on the following Monday (31st), to express their sympathy with the deprived ministers. On the 27th Sir Robert Peel brought forward a resolution in the House of Commons, recommending a tone of moderation and conciliation as well as of firmness and confidence in the discussions with China. June 21, the Act for the Compounding of Copyhold and Customary Tenures, and that for affording Facilities for the Conveyance and Endowments of Sites for Schools received the royal assent. August 9, the new parliament met. An amendment to the address was moved by Sir R. Peel, as an object of the resolutions. After a debate, the amendment was carried. On the 30th, the ministers announced their resignation, and Sir R. Peel was commissioned to form a new ministry. In September, amid increasing agitation and distrust and discontent, the extreme distress of the manufacturing districts of the country, October 4, a great fire occurred in the Tower, which destroyed the storehouses and the small-army arsenal. December 31, Lord Ashburnham was appointed to a special mission to the United States, in order to settle the various differences between the two countries, which he concluded in September 1842.

1842. January 17, the first stone of the new Royal Exchange was laid by Prince Albert. February 6, about 600 depositors of the Bank of England in London, to promote its objects. April 29, a new law for a graduated scale on the importation of foreign corn received the royal assent. May 4, the Boers of Port Natal having threatened to attack the new fort, they were attacked by Captain Smith with a small force, whom they defeat, but were beaten in a second action on June 26, and forced to submit. May 30, John Francis fires a pistol at the Queen, who escaped uninjured; Francis was tried for the attempt at the Old Bailey, found guilty, and sentenced to be hanged, but the punishment was commuted to transportation for life. June 4, there were riots at Cork and Ennis, occasioned by want of food arising from the potato rot in 1841; and great distress and discontent continued to exist among the manufacturing population of England. June 15, the treaty with the Chinese not having been ratified, the British forces entered the river Yang-tse-Kiang, and seized several forts with numerous cannon; and on the 19th they took possession of Shanghai. June 26, Sir Robert Peel's bill imposing an Income Tax of 7d. in the pound on incomes of 150l. a year and upwards received the royal assent. July 9, a deputation from the Anti-Corn-Law Association waited on Sir R. Peel, to represent the extreme distress of the labouring poor. July 10, a petition from the royal assent, proposing a representative government on New South Wales. August 8, a serious riot took place at Manchester owing to the distress, and the riots extended subsequently to other towns in the north. August 26, the Amendment Act received the royal assent. August 29, the visit of Prince Albert visit Scotland. September 30, a special commission was held to try the offenders in the late riots, when fifty-four were convicted, and sentenced to various periods of imprisonment.

1843. January 9, O'Connell announced at a weekly meet-
he proposed to continue the income tax, to repeal all duties on export, to abolish the duties on 430 articles which yielded only a trifling income, also those on cotton-wool, glass, and staves, and to substitute an annual licence for the auction duties; these were ultimately carried. March 6, Sir Robert Peel introduced an act to enable Parliament to establish public offices, which was passed on March 14. May 5, a banquet in aid of the Anti-Corn-Law Association was held in Covent Garden Theatre, by which 25,000l. was realised. On the 22d a meeting was held in London for the establishment of banks, and on the 27th a meeting in the Dublin Coffee House, Cambridge. May 23, the Arctic expedition of discovery, under Sir John Franklin, sailed from Greenhithe, and, unfortunately, never returned. May 25, a terrible fire took place at the new corn exchange at Manchester; the fire destroyed 20,000 persons left destitute; parliament voted 20,000l. for their relief; subscriptions were raised, and collections were made in all the churches, under the authority of the Queen's letter. May 29, a new convention between England and France for the better suppression of the slave trade was signed. June 15, a French and English squadron attacked Madagascar, in consequence of the Queen of Madagascar having threatened the traders of those countries with expulsion: they destroyed some forts and coast settlements, but nothing was accomplished. June 30, Sir R. Peel's Act for the endowment of Maynooth College received the royal assent; and on July 21, the Acts for the establishment of museums in large towns, for the assistance of new colleges in Scotland, and the amendment of the Poor Law in Scotland. October 31, Mr. Waghorn arrived with the East India mail, which he had brought for the first time by the Overland route. During this month the railway mania reached a crisis, and a second great effort was made to establish railways. The Irish Roman Catholic bishops condem the new colleges. November 22, Lord John Russell issues his letter to the electors of London, declaring for a total repeal of the Corn Laws. December 10, it having been previously understood that there had been many discussions in the cabinet on the subject of the Corn Laws, it was made known that ministers had resigned, and that Lord John Russell had been sent for to form a ministry. On the 20th, he having failed, Sir R. Peel's bill was introduced for, and re-accepted on the 16th. 1846. January 3, the corporations of London and Dublin presented addresses to the Queen representing the sufferings caused in Ireland by the potato-rot of the previous year. January 6, a meeting of agricultural labourers was held at Wootton Bassett in Wilts, at which they petitioned for the abolition of the Corn Laws. January 11, the New Zealand chiefs, who had previously committed several outrages on the British settlements, were attacked and defeated: on the 14th, the native commission was opened by the Queen, who referred to the failure of the potato crop, and recommended the consideration of the propriety of relaxing protective duties. On the 27th Sir R. Peel announced his intended repeal of the Corn Laws. May 3, an act was passed for raising a treasury order was issued allowing the importation of Indian corn, rice, and buckwheat, at a nominal duty of one shilling per quarter. April 4, the governor of the Cape of Good Hope commenced a war upon the Caffres, who had been committing depredations on the colonists. June 9, the town of St. John's, Newfoundland, was destroyed by fire; the damage done amounted to 1,000,000l. June 12, a treaty with the United States for the settlement of the Oregon boundary was signed by the American and British ministers. On the 26th the Corn Duties Repeal Act, and the Customs Duties Act, which gave great freedom to commerce, received the royal assent. On the same day, on the motion for the second reading of the Prevention of Wife Bill (a coercive measure for Ireland), the minister were defeated, and immediately resigned. On June 7, Lord John Russell and other members of the new ministry were sworn into office. July 28, W. S. O'Brien and many others seceded from the Repeal Association, and on the 1st of September, the Glasgow police were ordered to obtain their object by physical force. August 26, an Act for the establishment of Public Baths and Washhouses received the royal assent, and also the Act for establishing County Councils. September 4, forty-four districts in Ireland were declared by proclamation to the possession of the local authorities, and the provisions of the Labour Rate Act were directed to be put in operation in them. September 14, a formal protest was made by the British government against the marriage of the Duke de Montpensier, a son of the King of the French, with the sister of the Queen of Spain. October 2, the distress in Ireland continuing, and the provisions of the Labour Rate Act proving worse than useless, the lord lieutenant issued a circular authorising the undertaking of works of permanent utility, at the charge of the parish, for the benefit of the poor. October 18, a meeting was held in Edinburgh to consider as to the best means of relieving the distress in the Highlands and Islands of Scotland, where 350,000 persons were without the means of subsistence. 1847. January 2, the British Association established, by which large sums were raised by subscription for the relief of the distresses in Ireland and Scotland. In both of which countries the distress was amounting to a state of famine. October 6, parliament was opened by the Queen, who directed the attention of the Houses to the great distress prevailing, and called on them to provide measures for its relief. May 13, Daniel O'Connell died at Genoa, while on his way to Rome. June 8, the new Irish Poor Law Bill received the royal assent; on the 21st, that for the improvement of towns; and on the 23rd parliament was prorogued. October 17, thanksgivings were offered up in all the churches for an abundant harvest. October 25, in consequence of a great monetary excitement, the temporary suspension of Sir R. Peel's Bank Restriction Act was ordered, and the order was withdrawn November 23. November 18, parliament re-assembled, and passed an Act for the suppression of crime and outrage in Ireland. 1848. February 21, the revolution commenced in Paris by which Louis Philippe ceased to be King of the French. On the 24th the king abdicated. On the 26th the republic was proclaimed. Louis Philippe and his family fled, and Prince Louis Napoleon arrived in Paris. February 24, the proposed great Chartist demonstration on Kennington Common, near London. The government however had appointed special constables; an intended procession was prevented, and the affair passed off without a struggle; on May 31, the state trials in Ireland commenced; the jury could not agree in a verdict as to Mr. O'Brien and Mr. Meagher. Mitchell was tried on May 28 for seditious writing in the 'United Irishman,' found guilty, and sentenced to fourteen years' transportation. July 23, in a judgement took place between the Government and the government forces at Ballingary: the rebels were easily defeated. On August 5, W. S. O'Brien was captured, and on the 19th Meagher, O'Donohoe, and Lyne. August 20, twenty Charter leaders were arrested. August 29, Sir H. Smith defeated the rebels under Pretorius at Bleom Platts, in the Cape of Good Hope colony. August 31, the Health of Towns Act received the royal assent. September 30, the Chartist trials were concluded in London; the greater part were sentenced to transportation for life. October 9, the trial of the Irish rebels concluded, and O'Brien, Meagher, O'Donohoe, and M'Maus were sentenced to death. 1849. During this year the Hungarian insurrection against Austria, which took place in Hungary in Germany succeeded the revolution in France of 1848, but Great Britain took no part in these commotions. May 11, on the appeal of Smith O'Brien and others to the House of Lords the judgment was confirmed, and on July 9, they were all transported. On May 13 a large meeting was held at Cape Town to protest against the attempt to make the Cape a penal settlement, and the efforts made were ultimately successful. On June 28, the Act for repealing the Navigation Laws received the royal assent. On July 5, the Chartist Relief and Repeal Act. In August a report was furnished to the Cabinet at Washington by Colonel Mason, confirming the discovery of vast quantities of gold in California. On September 16, prayers were offered up in the churches for the removal of cholera. December, 1848, the agreement of the Russians to place the fleet that entered the Dardanelles. December 1, the Dowager Queen Adelaide died. December 18, a large assemblage of tenant farmers and cottiers took place at Mullinalhine in Tipperary to petition for Tenant Right. December 24, the Privy Council and Investigator leave Woolwich in search of Sir John Franklin. January 25, a meeting held in the Mansion House, London, in furtherance of the Industrial Exhibition of all nations. July 30, Baron
Rothschild, having been elected for the city of London, attended the House in order to take his seat, but was refused because he objected to take the oaths on the faith of a Christian. August 5, the Act for regulating metropolitan inter- motions, being under the Royal assent, as also an Act for the better government of the Austra- lian colonies, forming Victoria into a separate colony, and giving it a representative legislature. August 16, the Act enabling the Church of England in Scotland to receive the Royal assent, and making the prelates of the Church of England resident in Scotland subject to conviction in England, was passed. August 21, the Queen embarked at Osborne to visit the King of the Belgians. September 24, the pope issued a bull establishing a Roman Catholic hierarchy in England, which, on its promulgation, occurred on November 6, the Catholic ministry resigned, the government, in the interest of the nation, was formed by Charles James Thiers, discovered the North-West Passage by Prince of Wales's Strait. The ship was subsequently frozen up, and the crew were not rescued till April 1853, when they made their way over the ice to Cleveland. November 28, a meeting of the clergy of the Established Church was held at Oxford to protest against the pope's bull, which was followed by public addresses for the same purpose to the Queen from various parts of the country. December 31, Sir Harry Smith, governor of the Cape of Good Hope, declared war against the Caffres. He had been attacked by them and narrowly escaped on the preceding day, and the Caffres defeated our troops in several places.

1851. January 27, Earl Grey in a despatch places the Crimea under Russia, received the legislature of Canada. February 4, Parliament opened, and the Queen alluded to the Ecclesiastical Titles bill, as occasioned by the pope's recent bull. February 22, the Russell ministry resigned, in consequence, as stated, the Queen appointed Mr. Disraeli's motion in favour of agricultural protection, and of Mr. Locke King having carried a motion against them in favour of the extension of the county franchise. On the recommendation of the Duke of Wellington, the Duke of York, the Duke of Marcurt, and the Duke of Kent, were appointed in their places on March 3, May 1, the Great Exhibition of the Industry of all Nations in Hyde Park was opened by the Queen. May 22, the governor of New South Wales issued a proclamation for the search for gold in the newly discovered gold regions without a license. By the beginning of June 20,000 persons were employing themselves at the diggings. August 1, the royal assent was given to the Ecclesiastical Titles Assumption and the New Metropolitan Cattle Market Acts. October 23, Kowath arrived at Southampton, on the 30th he went in procession to the Guildhall of Lon- don, where an address from the city was presented to him. November 6, the Caffres defeated a British force at Water- kloof. December 2, the Prince-President of France dissolved the Lower House. December 28, Mr. Thiers, and others, and on January 2, 1852, his continued authority was voted by 7,430,916 votes against 640,737.

1852. January 1, the Roman Catholic synod of Thieres prohibited the Roman Catholic clergy of Thieres from conducting the Missions in which the Queen's colliege in Ireland. February 3, the parliament met; on the 90th the ministry were beaten on the Local Militia Bill, and on the 23rd they resigned; they were succeeded by one under the presidency of the Earl of Derby, who, on announcing his acceptance of office on the 27th, deprecated the attempts which were being made to produce a panic-fee of invasion by the French. April 13, Major-General Cathcart, who had superseded Sir H. Smith as governor of the Cape, issued a proclamation prohibiting the descent of Prince of Wales on the Vaal river. June 2, the electric telegraph between England and Ireland opened for communication. June 2, the independence of Greystown was guaranteed by the English and American governmets. June 20, the Act granting a representative constitution to New Zealand received the royal assent. July 1, the parliament was dissolved. July 3, a great Tenant—Right meeting at Waringstown in Ireland, at which Mr. S. Crawford, M.P., attended, was dispersed by the magistrates. November 2, a great railway meeting at Manchester, attended by 3000 persons. November 23, three ships arrived in the Thames with a large quantity of Australian gold. December 16, in the new parliament which had succeeded the old, the metropolitan, in fact, had a majority of the budget by 305 against 286; they immediately resigned; and on the 27th the Earl of Aberdeen announced that he had accepted office, and formed a new ministry.

1853. January 6, the Emperor of China legalized the importation of opium, in order to make it contribute to the revenue. March 9, a treaty with the Caffre chiefs was con- cluded by General Cathcart at King William's Town. May 3, Prince Mengezoff presented the Russian ultimatum to the Turkish government, claiming for the czar the protectorate over the Great Khan. May 29, the Russian commissioners were received, and war was rejected. May 12, the Industrial Exhibition opened at Dublin. June 26, the Emperor of Russia issued a manifesto against Turkey, and announced the march of Russian armies against the Crimea. June 29, the Queen reviewed the army at Kertch. October 14, the French and English fleets entered the Bosphorus. December 5, a protocol was signed at Vienna by France, England, Austria, and Turkey, for the maintenance of the integrity of the Turkish empire. December 19, Lord John Russell opened the House of Commons his new Reform Bill, which was aban- doned on April 11, in consequence of the state of public business. February 20, the Grenadier and Coldstream guards embarked at Southampton for Turkey, and other troops followed in rapid succession. March 11, the Queen reviewed a fleet at Spithead previous to its sailing for the Baltic. March 28, war declared by England against Russia. April 22, Odessa bombarded by the French and English fleets. June 7, a treaty concluded at Washington for facili- tating the intercourse of the British North American colonies with the United States. June 8, the Crystal Palace at Sydenham opened by Queen Victoria. June 16, the Act for doubling the income tax, on account of the war with Russia, was passed. June 19, the Act for regulating Oxford University received the royal assent.

1854. August 16, Bomarosu was surrendered to the allied fleet. September 14, the allied army landed in the Crimea, after suffering a very severe action on landing and the preceding month. On the 15th the Russians evacuated Moldavia, and the Daunhian Provinces were garrisoned by the Austrians. On the 20th the battle of the Alma took place, and the Russians were defeated. [RAGLAN, LORD, S. J. SAINTELIAMN, MARTIN, E. W. S.] On November 9, the Third of Seoshtsomm commenced. November 5, the battle of Inkermann, when the Russians were again beaten. On the 14th a violent storm destroyed many ships laden with stores, and caused great calamities on shore. This was followed by a season of great suffering; the roads were impassable; the weather was bitterly cold; men and horses, ill supplied with food or shelter, perished in large numbers, while medical attendance and hospital accommodation were woefully defi- cient. Great dissatisfaction was expressed at the terms, and private subscriptions to a large amount were raised to alleviate the distress. Miss Nightingale organised a staff of nurses, and proceeded with them to Constantinople to super- intend the hospitals, and attend the sick and wounded.

1855. January 11, the Grand fleet of the United Potentates of England, France, Austria, and Russia, were opened at Vienna. Lord John Russell was the English plenipo- tentiary, and his conduct in supporting the propositions of his Russian and Austrian colleagues, was the subject of parliamentary discussion on July 6, and led to his secession from office on July 13. January 10, Sardinia joined the allies, and undertook to send troops to the Crimea. January 29, Mr. Roebuck's motion for a committee to investigate the causes of the sufferings of the army in the Crimea was carried against the ministry by 305 to 145. In consequence the Aberdeen ministry resigned, and on February 10 was suc- ceeded by one of which Lord Palmerston was the Premier. March 2, Nicholas, Emperor of Russia, died, and was suc- ceeded by his brother, Emperor Wladimir. March 15, Poland, by the allies, whose fleets swept the sea of Azooff, and destroyed several towns and a vast number of vessels. June 16, the French attacked the Malakhof and the English the Redan, but were repulsed. July 1, a large assembly of persons took place in Hyde Park to protest against Lord R. Grosemer's Sunday Trading Bill, and some rioting occurred. The bill was withdrawn on the next day, but the meetings and the riots were continued on the two following Sundays. July 12, the Malakhof was bombarded by the allied fleets. August 14, the Metropolis Local Management Act, constituting a representative board for the management of the improvements of the whole of the royal palaces, was carried. August 17, the French captured the Malakhof, and in the night the Russians evacuated the south side of Seoshtom, of which the allies took possession. September 20, the Russians assaulted Kars, and were repulsed by the Turks, assisted by Sir V. F. Williams, several other English officers, and General Keme. Oc-
ber 17, Kiburn, at the mouth of the Dnieper, surrendered to the allies, and on the next day the Russians blew up the fortress of Otsakooff. November 26, Kara was surrendered to the Russians, after a gallant defence; Sir W. F. Williams and the English officers were made prisoners, and treated with great kindness by the Russians. November 30, the King of Sardinia arrived at Windsor Castle on a visit to the Queen. December 19, the united kingdom of Sweden and Norway joined the alliance of the Western Powers.

1857. September 11. The Queen, at the opening of the session of parliament, announced the acceptance by Russia of the terms proposed for a general peace. February 1, Mr. Murray, the British minister to the Persian court, quitted Tehran in consequence of the termination of the war by Russia. February 7, the Queen, having created Sir J. Erskine, Bart., a baronet of the Exchequer Court, a peer for life only, a motion to refer the subject to a committee of privileges was carried against the ministers. The committee reported that such a peerage gave no right to sit in parliament, which was confirmed by the House. Ultimately ministers gave way, and Baron Wenealydav was created a peer in the usual form. April 29, official proclamation made of the peace with Russia. May 25, public celebration of the conclusion of peace. June 10, commercial relations were re-established with Denmark, Edinburgh, and Dublin, and a general illumination took place. July 12, the allies evacuated the Crimia. July 29, the Act for establishing reformatory and industrial schools for criminals, obtained their second reading. August 20, the Queen of Ouds, a successor to the Nautch King, declared against the annexation of her son's dominions to the British possessions in India. September 4, the Royal British Bank stopped payment; on the accounts being investigated gross frauds were returned. September 28, the foreign commercial residents withdrew. November 10, in consequence of the Persians having taken Herat, in violation of a treaty, war was proclaimed at Bombay against that country. December 11, the collection of pictures belonging to Mr. John Sheepshanks was made over by him to the government as a gift to the nation.

1857. March 3, the ministry were defeated on a motion by Mr. Cobden, involving censure on them for the action on Canton. Lord Palmerston then announced his intention of appealing to the country for the continuance of the peace. The business of the House could be got through. Parliament was dissolved on March 21, and a new one summoned, which met on April 30. In a new election the most remarkable fact was the elevation of Mr. Cobden to a seat in parliament, which he called the "Peace Party," failed in getting returned. March 14, the treaty with Denmark for the abolition of the Sound Dues was signed at Copenhagen. An indemnity was to be paid to Denmark, of which England's share was settled at £300,000, and the dues ceased from April 1. May 5, the Art Treasures Exhibition was opened at Manchester by the Queen and Prince Albert. May 7, a mutiny broke out in the Indian army. [See Indian Empire, S. 2.] May 25 and 27, Oudh, one of the British naval forces, attacked a number of Chinese junks in Escabar Creek, and another attack was made on those assembled in Fathakan Creek, in the Canton river. Both attacks were successful, numerous junks were destroyed, a quantity of cannon taken, and a large part of the eneised force killed. The issue of this war, with the capture of Canton, will be found under CHINA, S. 2. June 20, an order in Council directed that in future Prince Albert was to be prayed for in the churches on the Prince Consort. July 10, the Oatham Bill, by which Jews were to be admitted to the House of Lords, was rejected in the House of Lords, after being carried in the Commons by a large majority. In November (chiefly in consequence of a commercial panic in the United States of America), the states of the bank suspended payment, and bankruptcies to the amount of fifty millions were declared. A gold panic occurred in Great Britain. Several extensive failures of commercial houses in London, Liverpool, Glasgow, and other towns followed. Two banks in Glasgow suspended payment, one of them in a state of hopeless insolvency, accompanied with the disclosure of imprudent management in discounting an enormous amount of accommodation bills. As early as October 8 the Bank of England raised its rate of discount to 6 per cent, which was increased to 7 per cent, on the 19th to 8 per cent., on November 5 to 9 per cent., and on November 9 to 10 per cent. On the 18th the operation of Sir R. Peel's Bank Restriction Act was suspended for the second time, and the Bank of England was ordered to issue an additional amount not exceeding two millions, for which an Act of Indemnity was passed on December 19. This calmed the panic, confidence was restored, the rate of discount was rapidly lowered, so on December 31st the bank raised the bullion in the bank increased from 6,666,000l. on November 11, 1857, to 17,617,925l. on March 3, 1866. The effects of the failure abroad, however, which had extended to Hamburg, and most other of the commercial towns of Europe, had most calamitous influences on the manufacturing industry of the country.

On January 14, 1866, an atrocious attempt was made to assassinate the Emperor of the French, by casting explosive balls among the crowd assembled to see him and the Empress pass in procession from the Tuileries to the Luxembourg. The assassination of O'Malley and Gomes were apprehended; and on its appearing that they had recently left England, where each had resided for various but not very lengthened periods, an outcry was raised in France against England, and a petition was presented by the French ambassador, which was published in the 'Moniteur," complaining of the defective state of the law in England respecting conspiracy, and asserting that in England it was allowed openly to advocate regicide. The Earl of Derby brought in a bill to stop this; and that he had undertaken the formation of a new ministry. This was accomplished, and the ministry was completed, and met the Houses on the 12th of March. The new cabinet abandoned the conspiracy bill, but continued the prosecution of Mr. Berkeley, for the ascpected complicity in the conspiracy against the Emperor's life. He was indicted as accessory to the murder of one of the individuals who perished from the explosion of the grenade thrown at the Emperor on January 14, but was acquitted on Sunday April 17, after a trial lasting 3 days, and during which 62 witnesses were called. CHINA, S. 2 almost ceased; and since the reduction of Lucknow [INDIAN EMPIRE, S. 2], the chief military operations have been the taking of detached forts or towns, and the pursuit and capturing of the Chinese, who have been many times driven out of the country. The new Chancellor of the Exchequer (Mr. Disraeli) introduced a budget, in which he announced the reduction of the income tax to 5d. in the pound, the equalisation of the duty on Irish distilled spirits with that of England and Scotland, and the imposition of a penny stamp on every cheque issued, for payment on a banker, all of which were subsequently agreed to.

On April 12 the Oatham Bill was again carried in the House of Commons, but was rejected in the Lords, so far as regarded the clause relieving the Jews. On May 14 Mr. Peel brought in a new bill for having made public a despatch from Lord Ellenborough, as President of the Board of Control, to Viscount Canning, Governor-General of India, condemning the proclamation issued by him. Lord Ellenborough explained the decision of the ministry, disapproved of the publication, Lord Ellenborough rested his case after several nights' debate in the House of Commons the motion was withdrawn on May 21.

VICTORIA, or PORT PHILLIP, a British colony in Australia, is situated on the western side of the continent, extends between [34° and 39° S. lat., 141° and 150° E. long.; and is bounded N. and E. by New South Wales, from which it is divided by the river Murray, and a line drawn from the head waters of that river to Cape Howe. W. by Victoria Gulf, and S. by the sea and the coast of Australia, from which it is separated by the meridian of 141° E. long. The form of the province is triangular, its greatest length being east to west about 800 miles; its
greatest breadth about 300 miles. The area is 86,000 square miles or nearly 63,000,000 acres. The population in 1846 was 32,900; on March 2nd 1851 it was 77,545; on December 1, 1852, the population was 121,127; in February 1856, Bradshaw's "Monthly Guide to Victoria," gave the total population as 430,650, including 33,285 Chinese and 17,680 aborigines. In 1855 it was estimated that the population of the gold-fields of the Victoria colony was 145,582 of which 20,546 were Chinese; in this number there were 3 women, and 3 children.

From Cape Howe, at the eastern extremity of the province, a line of coast, called the Long Beach, extends 200 miles, in a south-easterly direction. This part of the coast, which curves slightly inwards, consists for the most part of low and sandy shores backed by hills. Near the centre are several lagoons, and a considerable sheet of water called Lake Wellington. A short distance from the shore there runs a broad sand, with the exception of Warrnambool and Port Fairy, small harbours for coasting vessels. During the summer the south-easterly winds blow on this coast for three months with great force. From Wilson's Promontory to Western Port the coast is mostly high. From Western Port to the western boundary-line it is generally low. The low shores are sandy, except at some places where swamps exist. West of Cape Nelson the coast is bounded by sand-hills.

Western Port affords good anchorage for vessels of considerable size, and suits the other principal ports of the southern and south-eastern winds by Philip Island, which lies across its entrance. Port Phillip, situated at the western entrance of Bass Strait, is a harbour of great capacity. It is entered by a passage of hills and a half wide, bounded by Cape Nelson on the east, and Cape Lonsdale on the west. The channel is still further narrowed by some shoals which front the entrance. Within, the basin extends about 40 miles north and south, and midway attains the same breadth, seeming to have been formed by the collision of two ridges of Geelong. Hobson's Bay, at the northern extremity of the basin, affords good anchorage for vessels of all sizes, and forms the port of Melbourne. Lighter vessels ascend the Yarra-Yarra 8 miles to the capital, which is only a mile and a half from the sea, in height of 12 feet above the lowest low tide. A breach, 26 miles from east to west, and 10 miles from north to south, has good anchorage on its western shore in from 4 to 6 fathoms; but it is open to the south-east winds, and during the south-west gales a swell sets in, causing a heavy surf on the beach.

Wilson's Promontory, the most southern headland of Australia, is formed by a mountain, which is visible at the distance of 15 leagues. This rocky mass may be considered as the commencement of the Australian Alps, a range of mountains which, for a distance exceeding 70 miles, runs to the west of the north, and farther on, for about 100 miles, to the east of the north, until it approaches 37° S. Lat. From this part of the range, which has a mean elevation of 2000 feet above the level of the sea, there are extending towards the north and east and west. The accessibility both on the east and west are gentle, and are partially overgrown with forests, containing many timber-trees, mostly blue gum and black butt. Near 37° S. Lat., the range above the snow-line, and the portion of it is called the Ajuk Mountains. The valleys in this district comprise much land no less fit for cultivation than for pasture. That portion of the province which from the Point de l'est to the southern portion of the Australian Alps and the mountainous peninsula called Gippsland, extends along the coast to 148° E., longitude, consists of an inclined plane, which however near the mountains appears to descend with great rapidity, as in the middle of the region the plains only 250 feet above the sea-level. The northern portion of this country is traversed by several ranges of hills, which are of considerable elevation near the principal range, but grow lower as they proceed southward. The valleys exhibit a considerable degree of fertility, and the small towns are generally situated in them. In the centre of Gippsland are plains of considerable extent, which are covered with open forests, and are capable of maintaining numerous herds of cattle. The most southern part of the province is traversed by the central off-shoots of the Southern Australian Alps, which are covered with blue, green, and black butt, in which numerous timber-trees are found. The whole of Gippsland is abundantly watered by several streams. The country extending north-east of the province of New South Wales has been but partially explored.

On the north of Port Phillip the watered coast between the rivers falling into the Southern Sea and the Murray occurs about 45 miles from the northern extremity of the harbour, but farther to the west it is between 90 and 100 miles from the sea-shore. On both sides of the watershed the country is hilly and broken, and between 142° and 143° E. long. it rises into mountains. This hilly tract is in general from 30 to 40 miles across. To the north of it is an extensive plain, which descends gently to the sea-shore. Near the sea it is almost level or slightly undulating; but farther north it contains a rather large number of hills, rising from 500 to 700 feet above their bases; among them is Mount Buninyong, the highest peak of which is 3700 ft.; its southern slopes are overrun by lakes which are scattered over this plain, one of which, called Carangamite, is about 90 miles in circumference. Its waters are salt, as are those of nearly all the others. The isolated hills or mountains that appear, from their formation, to be of volcanic origin. This hilly tract contains extensive tracts of the finest land for pasture and tillage. West of the river Hopkins (142° 49' E. long) the land along the sea-shore, as far as Port Bay, is generally poor, and that lying west of that place is still more indifferend. But that portion of the plain which lies north of 36° S. lat. contains a large portion of good land. In some parts it is overgrown with thick forests of Eucalyptus trees, Bignonia, Cassowaria, and other trees peculiar to Australia; they are liberally watered by streams, which are generally free from grass. The numerous hills are thickly wooded, and the best soil is found at their bases.

Of the western division of the province, which, for its beauty and apparent fertility, is called by Sir Thomas Mitchell, who first explored it, Australian Holland. The best portion is that which lies within the hilly tract on both sides of the watershed. Nearly all the ridges by which this tract is overtopped run nearly at right angles to the watershed. The principal of these ridges is one of the most western of the mountainous extremity, and has been called the Grampians. Nearly in the centre of the Grampians stands Mount To-oil, or Mount William, which rises to 4600 feet above the sea-level. Mount Abrupt is 1700 feet, and Mount Sturgeon is 1071 feet. Above these, the sandy and undulating land, which consists of many ranges, with a mean elevation of about 200 feet above the sea, is generally covered with thick timber and pasture.

The country which is drained by the rivers originating in the central and western portion of the Grampians appears to be the most fertile tract of New South Wales. It is abundantly watered by the Nangeela, or Olneya, and its tributaries. The soil is black and rich, several feet deep, and rests on a subsoil of clay. The surface of the higher portion of this plain is strongly undulating, and on it are found many small sandhills.

The hilly tract of the watered east of the Grampians has its surface diversified by numerous narrow ridges of rocks, several round hills of moderate elevation, and many rather narrow valleys traversed by clear and beautiful streams. In some parts it is overgrown with thick forests, in places free from wood, but overgrown with grass to the top. About 30 miles east of the Grampians, some more elevated ridges traverse the watershed. They have been named Pyrenees, but the natives call them the Black Hills. They consist wholly of granite, but are all grassy to their summits, and very thinly wooded. East of the Pyrenees the country more is broken and the hills are higher. There are forests chiefly composed of box and lofty blue gum trees. A considerable portion of the soil is sandy, and the country is covered with extensive forests of fine tall timber-trees of Eucalypti. The country which is drained by the rivers originating in the southern and western portion of the Grampians appears to be the most fertile tract of New South Wales. It is abundantly watered by the Wangeda, or Ogilvy, and its tributaries. The soil is black and rich, several feet deep, and rests on a subsoil of clay. The surface of the higher portion of this plain is strongly undulating, and on it are found many small sandhills.

Between the hilly region of the watershed on the south, the mountainous region of the Australian Alps on the south-east, and the course of the Murray on the north, and the boundary
line of South Australia on the west, lie the plains of the Murray River. The Murray and its tributary the Bayungu flow in wide bottoms, sometimes 8 or 10 miles across, which bottoms are overgrown by high trees, partly swampy or covered with reeds, but having an exquisite degree of fertility in the vigour of their vegetation. In some places are found salt lakes in considerable numbers, but in general the plains are open, grassy, and beautifully diversified with patches of芦苇 clumps of reeds. Even at a con-

siderable distance from the Murray the water is scarce, as there are numerous hollows in the plains, which generally contain water. The plains of the Murray are fit both for cultivation and rearing of cattle. The river Murray, rising many miles above Ballarat, flows in a line along the boundary of the province, entering South Australia at 34° S. lat., after a course of above 600 miles. In the lower part of its course along the border it has a channel 300 yards broad, with a depth of from 12 to 20 feet. Its chief tributaries, which drain the northern division of the colony, are the Mitta-Mitta, Ovens, Goulburn, Campaspe, and Loddon, most of which are dried up during summer and converted into chains of ponds. The Mitta-Mitta rises in the Australian Alps, not far from Lake Omeo, the neigh-

bourhood of which forms one of the gold-fields of Victoria. The Loddon rises near Mount Alexander, the principal gold-field, and its feeders, after the rainy season, are employed in the process of gold-washing. The Avoca, Avon, and Wim-mera, also tributaries of the Pigmy and Grampians chains. The Glenelg, collecting several tributaries from the western slopes of the Grampians, flows southward along the frontier, and enters South Australia just before reaching the ocean. It is in the several affluents, water the country south from the Pyrenees, reaching the sea on a little to the eastward of Port Fairy. The Barwon, after flowing in a north-easterly direction to the neighbourhood of Geelong, bends to the south-east, and falls into the sea near the entrance of Port Phillip. The Yarra-Yarra, a considerable stream, which washes the capital, is subject to heavy floods during the rainy season. It comes in from the mountains to the east of Melbourne and continues in a very circuitous course to the mouth of Port Phillip. It is navigable to the city for small vessels and steamers of light draught. The Latrobe, rising in the Great Swamp, which is divided from Western Port by a belt of land a few miles broad, intersects the southern range of the Alps and flows eastward through Gipps-

land into Lake Wellington. Lake King collects the waters of the Tambo, the Riley, and the M'Arthur, which drain the northern district of Gippsland.

The predominating rocks in the higher masses of the Aus-
tralian Alps are granite, schist, and quartz, intermingled occasionally with sandstone and breccia. These rocks are thrown into si-

aty texture. Quartz, ironstone, sandstone, and clay-slate are general throughout the other hilly portions of the colony. Veins of coal have been found on the coast between Port Philip and the Yarra-Yarra. The Yarra-Yarra, besides lead and mangan-

eese. Rich veins of copper ore have been discovered in the banks of the Yarra-Yarra. The chief mineral however is gold, the discovery of which in 1851 has led to a remarkable increase in the wealth and population of the colony. The gold is found chiefly at Ballarat, 40 miles N.N.W. from Geelong; at Mount Alexander, 76 miles N.W. from Mel-
bourne; and around Lake Omeo, in the Australian Alps. At Ballarat, where the precious metal is found extensively on the margin of the pondage in the season of watercourses, a section of the workings exhibits the following strata:—Red ferruginous earth and gravel, streaked yellowish and red clay, quartz gravels of moderate size, large quartz pebbles and boulders with masses of ironstone set in very compact clay, blue- and white-clay and pipe-clay. The gold is uniformly found in the formations superior in position to the pipe-clay. The richest deposits occur in the blue-clay, where the ore is for the most part quite pure. It is washed from these beds in large Konis of water, and the gold is found in fused pieces of pure native gold, occasionally with quartz-pebbles, and occasionally in rolled water-worn lumps called nuggets. The quantity found has been enor-

mous, and the rush of emigration and others to the diggings was at first proportionate to the production. But the period of activity was but the judicious establishment of a mounted police, and the imposition of a small tax for a licence to dig, reduced the system to great regularity in a short time. The amount of gold exported in 1855 was valued at 10,302,980l. In the early part of 1855 serious riots took place at the gold-
diggings of Ballarat, in consequence of the miners resisting the payment of the licence fees. This led to the substitution of a tax on gold exported from the colony, instead of the licence fee for diggers.

The climate of Victoria is comparatively mild. The mean temperature of summer is 65°, of winter 48°, of the whole year 57. The atmosphere is so dry and elastic that the baro-

meter is sometimes very intense, is less oppressively hot. The temperature occasionally comes from the north, and in 20 to 30 hours reaches 100°. The thermometer are to an ex-
h-treme heat, but they do not occasion great inconvenience, and they are generally succeeded by a refreshing breeze from the ocean. During June, July, and August, the winter months, water flows through the gold-digging districts. In some localities snow showers fall. In August, 1858, snow fell at Bellarine to the depth of seven feet. The average fall of rain for the year is 30·7 inches. The rapid changes of temperature sometimes 30 degrees in 24 hours, are unfavourable to con-
sumptive patients. Dysentery and a species of opthalmia prevail to some extent in the hottest months. On the whole, the climate is found agreeable and salubrious. To wild animals found in the province are, the dingos, or native dogs; the great grey kangaroo, which abounds in some dis-

tricts; the rock wallaby, or badger; kangaroo rat; opossum; flying squirrel; wild cat; bandicoot; sloth, or Australian bear; and various others. Among its birds are, the bustard, or wild turkey, which on some of the plains appear in co-

siderable numbers; the emu, or Australian policeman; the lyre-bird, or Australian pheasant, which frequents the mountains of Gippsland; black swans, which abound in the neighbourhood of Western Port; the emu; magpie; pe-

can; eagle-knighter; and plow. The variety of fish is remark-
able, and a great number appear in great numbers; summer, and also lizards and other reptiles. The bays and rivers abound with fish. Codfish of a large size are found in the rivers of the northern district. Shoals of herrings appear on the coast in great abundance. Several very important timber-trees are, the red-gum, lightwood, blackwood, pine, tea-tree, she-oak or fun, honey-suckle, and ipe-r-

chuck. The kangaroo apple-tree, the grass-tree, and the que-

dang, which forms a fine preserve, are indigenous. The fruits which have been successfully cultivated are, the plum, quince, nectarine, apricot, pear, apple, mulberry, almond, and fig. Several vineyards have been formed. Vegetables are abundant. The potato, turnip, carrot, ca-

bage, broccoli, and radish, grow in a very enormous size. Indigo and flax are indigenous. The tobacco and castor-oil plats and Indian corn grow luxuriantly. The common cereals are produced in great perfection; wheat is of the finest quality, with a return of from 40 to 50 bushels an acre. The wheat-producing district is on the eastern part of Aus-

tralia for the growth of wheat, Indian corn, and potatoes.

In all parts of the colony there are tracts of the finest arable land. But sheep-farming is the principal pursuit in the province, apart from the recent mining operations, and the expectation is that with the addition of very greatly to this. The settled part of the province, comprising principally the eastern and southern portions, is divided into 34 counties. Melbourne, the capital of the colony, is described under Melbourne, S. & S.; but we may add here that in 1858 the receipts were 654,684l., of which a great part was raised by loan; and the expenditure was 669,772l., of which 291,504l. were expended on public works in the city. There are 8 daily newspapers, 8 bi-weekly, 6 tri-weekly, and 51 weekly new-

spapers. The following is a list of the important places in Melbourne. Most of them are of a large size, extremely well printed, and some of them edited with great ability.

The second town in the colony is Geelong, now an im-

portant shipping port, pleasantly situated on the south-

western shore of Port Phillip, at the head of Corio or Geelong Bay. It is regularly built, well supplied with water, and a steadily advancing in population and trade. Smaller towns ascend to the town, but those of greater burden discharge a very important share of the trade of Port Phillip. The town of Geelong consequent on the gold discoveries is shown by the town revenue in 1851, 1852, and 1854, which show-

thus: 1851—2876d. 4s. 1d.; 1852—10,697l. 16s. 1d.; 1854—

1,874l. 1s. 1d. The gold discoveries have also been of the most in public improvements, a large amount of which has been borrowed by the corporation of Geelong for the purpose carrying out extensive improvements. A railway to Me-

lbourne has been constructed. Near the mouth of the Yar-

on the north-east shore of Port Phillip, are the next village
The town of Portland is built near the western extremity of the bay of the same name. It has a small population, but occupies a considerable space, being built in streets crossing each other at right angles. There are some whaling establishments, and the whaling ships, and the neighbouring districts are shipped at the harbour, which is inconvenient and exposed. Bessoil, an active and thriving town, is situated on Port Fairy, some miles east from Portland. It is the port of a considerable agricultural district. A Presbyterian church, built of stone, replacing a wooden structure, was opened here in the early part of 1855. Ballarat, the seat of the gold-diggings of that name, is described by Mr. William Howitt, who visited the place, as containing a large population, who are settling down into regular habits and are constructing a neat, well-laid out, and commodious town.

The principal towns in Victoria colony, in addition to those already mentioned, are:—Alberton, Avoca, Ballan, Beechworth, Beechworth Central, Benalla, Bega, Benalla North, Berridale, Bowraville, Braddon, Brighten, Bungaree, Burnham, Castlemaine, Cheprow, Colac, Flemington, Kilmore, Kyneton, Mount Alexander, Port Fairy, Prahran, Richmond, Sandhurst, and Wangaratta. Brashaw's "Monthly Guide to Victoria," for Feb. 1858, gives the number of post towns as 147.
VIDOCQ, FRANÇOIS-JULES, the chief of the detective brigade (Brigade de Sûreté), at the prefecture of the Paris police, established in 1812, whatever must be thought of his early life as a thief and inmate of the convict yards, undoubtedly did real service to France, by his active pursuit of the marauders who levy contributions on their neighbours' goods. He was born at Arras, the chief town in the department of the Pas de Calais on the 23rd of July 1776. His father was a baker, and was chosen to supply the local government, during the revolution, with bread, flour, &c. Young François was employed in the business before he was thirteen; but formed acquaintances who led him to pilfer his father's money by means of several artful contrivances. These being detected, the boy began to pilfer the stock, spending the proceeds with his companions at a neighbouring wine shop. A watch was at length set over him; which did not prevent his stealing ten silver forks and spoons, and pleading them. For this offence his father gave him in charge, when he was sent to the House of Correction for a few days. While in confinement he was incited by a young fellow-prisoner to rob his father again, by picking the lock of the till, and taking out the whole contents amounting to 80l. Having divided this money with his accomplice, he left Arras, intending to sail for the United States; but the high price of the passage made him change his mind; and being at Ostend a few days after, he was plundered by a sharper of all his ill-gotten gains.

In this state of destitution, he hired himself to an itinerant showman, who kept a small menagerie. His allotted task consisted at first in sweeping out the cage and the reception room. His master, after promoting him to the rank of tumbler and acrobat, wanted him to play the part of a savage who eats raw flesh and drinks blood. The wretched boy refused to undertake this new character, and was discharged. He next took service with the master of a puppet show; from whom he was passed into the hands of a peregrinating quack-doctor. At length weary of this hard probation of vagrant life, which had lasted two years, the seeming penitent returned home, and a kind old priest prevailed on his father to forgive him and receive him. This was in 1791, in his sixteenth year.

But he was too idle and restless for regular work; so he enlisted (after one or two escapades), in the regiment of Béarnon, and set out for Belgium, then the seat of the new war, between France and Austria. He was present in several actions, and was made a corporal; but, having quarrelled with his drum-major, and challenged him to fight, he deserted to avoid a court martial. He then enlisted in the 11th chasseurs, and fought at the battle of Jena, November 6, 1799. Having distinguished himself at the capture of Louny, under Kellermann, October 20, 1799, and being of unusual stature for his age, he was made a corporal of grenadiers. A day or two after he was recognised as a deserter, when he made his escape to the Austrian outposts. Unwilling however to fight against his own countrymen, he counterfeited illness, and began to teach fencing.

After a short stay with the Austrians, he got back to France, entered the 14th regiment, and then returned to the 11th, being present at several actions, and being wounded three times. One of his wounds obliged him to return to Arras, where in consequence of a quarrel he was denounced to the Revolutionary Tribunal as a 'Médecé,' and thrown into prison. However he was soon after released, owing to the good offices of Mademoiselle Bevaller, the daughter of the notorious Joseph Lébon. He married her in 1793, but they separated almost immediately. The next year he went to Brussels, became a professional gambler, made love to a污染防治er, and repenting of his treachery or fearing punishment for bigamy, just as he was about being married to her, confessed the imposture, was rewarded with a considerable sum of money, and took the diligence for Paris, which he entered for the first time in 1796, at the age of twenty-one.

He had not been in the capital many weeks, before the dangerous society of gamblers, swindlers, and loose women, left him once more penniless; which compelled him to return to the army of the north. Several fresh instances of folly, three imprisonments, and as many escapes, succeeded; after this he was confined in the prison of Douai, where he remained eight months. During his confinement, he was mixed up in a case of forgery, which in his autobiography he tries to explain as an act of inadvertence, rather than of guilt. For this however he was tried, convicted, and sentenced to ten years' penal servitude at the galley. As they conducted him, bound to the chair, he excited a revolt among the convicts, but the attempt to escape having failed, he reached Brest, and remained six years at the bagnio.

In this place he completed his studies of the manners, the crafts, the habits, of every class of thief. Two years before the expiration of his penalty, he contrived to escape from the convict-yard, assumed the name of Duval, and returned to his own neighbourhood, where he became an usher to a school at Ambriecourt, near Lille. He was soon re-captured, and sent to Coulon. From this convict-yard, he was then made what he calls "his finest escape." After this he joined a band of freebooters in the south, who plundered the stage-coaches on the highroads. But these malefactors having detected the branded convict on his shoulder, dismissed him from their company, having first made him swear not to
betray them. He resolved to be revenged; and this incident became the turning-point in his fortune. As he was making for the north, Vidocq, having no passport, was arrested and taken before a magistrate, to whom he offered to give such intelligence as would enable him to surmise his late crimes in the heart of plunder. For this purpose, he applied for a temporary release. But the magistrate demurred. "Suppose, on my way to prison," said Vidocq. "I get away from my keepers, come back to you, and resume my bondage, will you then grant me the proviso of being allowed to give information for my own advantage?" He escaped, and made good his offers to assist justice. This service was followed by others far more considerable. These events took place in 1804, but he continued for several years the slave of his antecedents. In 1806 he went to Paris again under the pretense of examining the plays and the dramas which he had learned during the course of his nomadic life. He became a toy manufacturer, a dealer in hardware, and a tailor; but other thieves, who had known him in prison, and who were well acquainted with his embarrassments, left him no peace: sometimes they wanted money, at others they proposed a good bargain; next it was some plunder to be hid. On one occasion they borrowed his cart, to convey the body of a murdered victim to a place of safety. He gained his freedom, but not without hazard.

In 1809, driven to extremity, Vidocq presented himself before M. Henri, the commissioner of the secret police of Paris, acknowledged his critical condition, and offered to give valuable information in case he might be allowed to come and go as he pleased. Several of these solicitations had been several times renewed, in the midst of which he was once more arrested. On this occasion he was sent to Bicêtre, when M. Henri, interested by his perseverances, and in order to prevent his escape, arranged with him a scheme of which he continued to make by correspondence, at last consented the Minister of Police, Pasquier, who returned a favourable answer, in which Vidocq was instructed to furnish information. His revelations then became so numerous and so important, that M. Henri was authorized to keep the knowledge of them, and to employ them. The qualities he displayed in his new functions soon attracted attention. Few detective officers ever possessed so much presence of mind, keen intelligence, bodily strength, courage, and diligence; besides that facility of slang and language, which is the essence of the vulgar. He made it a point, from the outset of his new vocation, to produce at once the culprit and the proofs of his crime. The receivers of stolen goods found in him a more relentless enemy than the thief. At first he put under surveillance the regular police officers; but in 1813 he was withdrawn from their control, and placed under the order of M. Henri alone. His captures were extraordinary. The famous thief Delporte, and Flard, the robber who afterwards stole the most important MSS. of St. Germain des Pres, were shot and handed over by this secret agent to justice. La Contelle, a sort of St. Giles', infested with the worst vagabonds, was purged; the great brigand, Desnoyers, and thirty-two of his accomplices, were taken. About the same time, the famous brigade of detective police (Brigade de巡宮), directed by Vidocq, was formed, consisting at first only of four men; in 1817 the number rose to twelve; and in 1834, when its complement was full, it contained twenty-eight detectives. "It was with this limited force," says Vidocq, "that I had to watch and look after 1900 returned transported, and issue every year from four to five hundred writs." In the single year 1817, he effected 775 arrests, and 39 seizures of stolen goods. His useful brigade cost but 2000£, a year, of which the greater part was deteriorated to the maintenance of his household. In the term of his official employment, he was the butt of continual charges, suspicions, and open accusations. He was said to take part in every crime, to incite robbers for the sake of arresting his dupes, and to have a share in all the plunder. This caused the enmity of the government, and in 1825 he was superseded in his functions by Lacour, whose antecedents resembled his own. In 1826 he established a paper manufactary at Saint-Mandé; and in 1829 he founded the Sarthe, a weekly and a bi-weekly which he employed to give information of the political agitators of the day, but his vocation was not either permanent or precise. Then, in 1834, he set up an office for information on behalf of Trade and Commerce, the object being to enable the fair trader, when applied to for credit, to ascertain the degree of trust to which his new customer was entitled.

In 1844, stimulated by the success of Eugène Sue's 'Mysteries at Paris,' and certain works of the same questionable character, which had appeared in London, he republished his Mémoires, under the title of 'Les Vrais Mystérieux de Paris.' The morbid taste for notoriety of any kind which then prevailed, induced Vidocq to visit London, and exhibit himself, with many curious articles used by French burglars, in the rooms of the Cosmoarans in Regent Street. But this speculations did not answer his expectations. Soon after he fixed himself in Belgium, where he died in 1850.

VINET, ALEXANDRE-RODOLPHE, was born at Lausanne on the 17th of June 1797. His father, who held an official appointment in his native canton, a man of superior attainments, but a somewhat stern disciplinarian, having himself been a pupil of Pasquier, was a strict adherent of the Calvinistic creed. In his youth, his studies were chiefly directed to theology, to which he had been devoted to the service of the church; but then, as throughout life, literature possessed for him a predominant attraction. But still, so indolently had he laboured in his field, that at the age of twenty he was appointed professor of the French language and literature at the gymnasium of Basel. Two years later, 1819, he was ordained at Lausanne a minister of the protestant church, and the same year he commenced his theological course; but during the ensuing years, took an active and prominent part in the great religious movement or 'reval' which occurred amongst the Swiss protestant churches. Besides various pamphlets which he put forth in connection with this movement, he published a dissertation against an opposition to it, he published in 1826 an elaborate 'Mémoire en faveur de la Liberté des Cultes,' and he gradually came to be regarded as one of the leaders of the evangelical party.

M. Vinet was one of the chief promoters of the new ecclesiastical code, which was finally adopted in 1837, and he was for many years, a powerful instrument in the hands of the religious unionists of Switzerland. But when, in 1841, he was made a member of the ministry of the interior, he resolved to devote himself to the study of literature. In 1897 he published a selection of his essays contributed to it, and other miscellaneous, under the title of 'Essais de Philosophe Moral.' In 1837 Vinet was invited by the authorities to take the chair of the new ecclesiastical code, and he was chosen its delegate for the class of Lausanne and Vévey. He took a part in all the protracted discussions which followed, but he could not bring himself to acquiesce in the decisions of the majority, and, accordingly, upon the promulgation of the new constitution which was to come into operation in 1841, he, at the end of 1840, formally seceded from the national church, and resigned his professorship of theology. His opinions had in fact from the publication of his 'Mémoire en faveur de la Liberté des Cultes' in 1836, been approaching more and more closely towards 'voluntarism,' and from this time he became a decided, and, among French Protestants, perhaps the most distinguished advocate of the entire separation of church and state. His matured views on this subject are to be found in the following work, which he published in 1850, under the title of 'An Essay on the Principle of Personal Religious Conviction, and upon the Separation of Church and State, considered with reference to the Fulfilment of that Duty.' But Vinet was far from being the harsh partisan of extreme measures. Adhering to his own views, he exhibited a wide tolerance of the honest convictions of others, and his later years were spent in preaching peace and brotherly love, and seeking by the amenities of literature to soften the asperities of theological controversy.

His last labour was the elaboration of a constitution for the Free Church of the canton of Vaud, formed by the ministers
who seceded from the establishment in 1845, and which he induced the committee appointed by the Church in 1846 to prepare the constitution, to adopt in its integrity. With the Synod however, in which the ultimate adoption of the constitution was vested, he was less successful, and the matter was left undecided. He died without having seen the necessary plans, and those having met with the emperor's approval, the first stone of the new works was laid on the 25th of July 1852. The operations were pressed forward with the greatest vigour, but Visconti did not live to see his city completed. He died on the 29th of December, 1853, having been struck with apoplexy, which is said to have been brought on, or hastened, by over-exertion and anxiety. Visconti's plans were carried out to their finish under the supervision of the inspector, who was appointed to succeed him, and on the 14th of August, 1857, the vast undertaking was declared finished, and the junction of the Louvre and the Tuilleries was inaugurated with great pomp by the Emperor. Of course in time the new buildings having to be rendered uniform in their elevation with those already existing, there was little room for originality, but it is admitted that Visconti has overcome the difficulties arising from the peculiarity of site, &c., in a most conscientious manner, and that he has by his additions, which while harmonizing with the older portions, are more or less consistent in style, — rendered it one of the most magnificent royal residences in Europe.

VITALITY, a term equivalent to that of Life, and applied to the forces, which are manifested in all animals. It is that principle, that is, plants and animals. 

Linnaeus defined the three kingdoms of nature as follows: — Minerals grow; Plants grow and live; Animals grow, live, and feel. Here the fact of living is made to distinguish between minerals and plants, and the rest of the animal life. It is often assumed to be a set of actions under the controlling influence of vital principle, but, as such a principle has never been demonstrated, it must only be regarded as an assumed cause.

Some writers have supposed that all the phenomena of life may be resolved into the action of chemical and physical forces acting upon special forms of matter, and that in plants and animals are presented the results of chemical and physical activity in forms in which it is not existent in minerals. Coleridge, who has termed his 'Idea of Life,' contends that the collective activities of the material universe is as much a life, and its parts as much entitled to be regarded as living, as a plant in its special organs.

Setting aside however the idea of a vital principle, or confining this term to the force which regulates and produces the specific form in each individual animal or plant, and which is then applicable as well to minerals, there are a certain set of phenomena in plants and animals which the term Vitality may be usefully applied in. It may be thus applied without in any manner assuming the existence of any force independent of those which are known to influence all matter upon the surface of the earth.

Thus, the growth and reproduction of plants should be regarded as a vital expression of the contractibility of the muscular tissue, and the sensibility of the nervous tissue. These processes are called collectively Vital Processes. The force by which cells grow has been called the Organizing Force, the Plasmatic Force, the Assimilative Property, and the Metabolic Property. The contractibility of the muscles has been properly called Muscle-Force, whilst the sensibility of the nerves has been called Nerve-Force.

That these forces are dependent on physical forces is seen in the fact that in case of the plants will not grow without light. Muscles-force and nerve-force are not producible but by the assimilation of materials that have been formed by chemical actions produced by heat and light.

The natural philosopher has demonstrated that electricity, galvanism, and magnetism, are different manifestations of the same force. He has rendered it probable that motion, heat, light, and chemical affinity, are also convertible forces. The physiologist has followed this train of thought, and has endeavored to demonstrate that, whatever is produced by the influence of heat and light upon the carbonic acid and ammonia supplied to the cell of the plant. A certain amount of protein is the expression of a certain amount of chemical change, and this again in decomposition is the...
expression or the amount of vital force, which a part composed of protein will exhibit. Vital phenomena are found to be the expressions of chemical and physical changes, and result in one or other of the physical forces. This view of the nature of vitality does not lead to materialism, as the consciousness of man exists independently of the physical changes which go on in his body, and the character of his mental activity is due to the ever-active changes which go on in his body through the agency of the vital forces. (MUSCLE; NERVOUS AND NERVOUS SYSTEM; MOTIONS OF PLANTS; VEGETABLES; VEGETABLE KINGDOM; CELLS, S. 2.)

PHYSIOLOGICAL RESEARCHES, in Philosophical Transactions; Matteucci, On the Physical Phenomena of Living Beings; Grove, On the Correlation of the Physical Forces; Reynolds, Objects and Scientific Position of Physiology; British and Foreign Medical Review, vol. xxx.

VIVIANACEÆ, Vivianoids, a natural order of Exogenous Plants with free stamens, no disc, albinous seeds, a curved embryo, permanent petals, and a ribbed calyx. The species are herbaceous or half-shrubby plants, with opposite or whorled leaves, without stipules. They are related to Tiltosaceæ and Tropoeolaceæ. All the species inhabit Chili and South Brazil. There are 4 genera and 10 species.

VOGEL, DR. CARL, born at Leipzig, in Saxony, in 1826, was master of one of the principal schools. He was educated at Leipzig, and afterwards studied astronomy at Berlin under Professor Encke. He resided in London about two years at Mr. Bruck's private observatory, and the discovery of the hyaline remains of which the outer wall of the globe is constituted. The deep green colour of the contents of these stellate embryos, and their subsequent changes into an orange colour, at once point out their close analogy with those of V. aureus. I have no doubt of their being merely modifications of the latter; and in fact they are so very frequently to be met with in intermixed, and on several occasions I have observed smooth and stellate globules in the interior of one and the same parent globe.

The organism described was first observed by Ehrenberg, under the name of Spharosira Volvox, also presents the appearance of a transparent globe set with green spots, but it differs from the foregoing in two important respects:

1. In the absence of any internal globules or embryos.
2. In the irregular size of the green granules lining the wall, which, instead of being of a uniform size, are of various dimensions.

Mr. Busk and Professor Williamson, in the first volume of the new series of Microscopical Society's Transactions, have furnished in great detail an account of the development of these curiously organised granules. From their observations, it appears that the green ciliated granules which stud the surface of the Volvox are produced from a single central embryonic mass by successive division by segmentation. Mr. Busk observed in these green granules a curious phenomenon.

It will also be observed, that each ciliated cell or zoospore, as it may analogously be termed, contains a green granular mass or masses, composed, for the most part probably, of chlorophyll granules and a more transparent body, which I suppose may be regarded as a nucleus, and derived, as it would appear, from one of the bright spheres which have been noticed before. At an early period after the maturity or completion of the zoospores they exhibit a minute circular clear space, or sometimes, but I think rarely, more than one, which is worthy of very attentive consideration. This space is of pretty uniform size in all cases, and about 1-0000ths of an inch in diameter. It may be situated in any part of the zoospore, or not infrequently in the base, or even in the midst of one or other of the bands of protoplasm connecting it with its neighbours. Its most important character is its transparency; it is an already known to be possessed by similar spaces or vacuoles in vegetable cells, but what appears to me a very curious, and as yet unnoticed, peculiarity of this contraction, consists in the fact that it is very regularly rhythmic. In several cases in which I have watched the process, this number of contractions occurs at some time, the contractions or pulsations occurred very regularly at intervals of about 38° to 41°. In one case, however, if was not misled in the observation, the interval was about twice this, namely, 1° 29'. The contraction, which appears to amount to complete obliteration of the cavity of the vacuole, takes place rapidly or suddenly, as it were, whilst the dilatation is

VOLBORTHITE. [Mineralogy, S. 1.]

VOLTAITE. [Mineralogy, S. 1.]

VOLOX, a genus of organic beings referred by Ehrenberg to his family of Protista. Golubow was the first to doubt the correctness of Ehrenberg's classification, and the result has been that through the subsequent researches of Williamson, Busk, and Cobin, the species of Volvox are now regarded as forms of the vegetable kingdom.

The species consist in: V. globator, V. aureus, and V. stellatus. A fourth form is described by Ehrenberg under the name of Spharosira Volvox.

The following is Mr. Busk's account of these forms of Volvox:

"The more common and best known form of Volvox globator, to the naked eye, or under a low power, appears as a transparent sphere, the surface of which is studded with numerous regularly placed green granules or particles, and which, in the interior several green globules, of various sizes in different places, though nearly always of uniform size in one and the same parent globe.

"These internal globules, which are the young or embryo Zoosporæ, adhering to the wall of the parent globe, through the precise mode of connection is not very apparent. When thus affixed, they are in a different concentric plane to the smaller green granules. At a later period, and after they have attained a certain degree of development, these internal globules, or cell, exhibit precisely the same structure as the parent globe, or small granules, of them consisting in the deeper green colour of the internal globules. These however soon exhibit a more important distinctive character in the formation of a distinct cell-wall of considerable thickness around the dark-green globular mass. This wall becomes more extended and more distinct; and, after a time, the contents, from dark-green, change into a deep orange-yellow; and simultaneously with this change of colour the wall of the globe acquires increased thickness, and is stellate.

"The third form, or Volvox stellatus, differs in no respect from the second, except in the form of the internal globules, which exhibit a stellate aspect, caused by the projection on their surface of numerous conical eminences, formed of their globules and stellate embryo, the whole of which is then defined by the successive division of the hyaline substance. The deep green colour of the contents of these stellate embryos, and their subsequent changes into an orange colour, at once point out their close analogy with those of V. aureus. I have no doubt of their being merely modifications of the latter; and in fact they are so very frequently to be met with in intermixed, and on several occasions I have observed smooth and stellate globules in the interior of one and the same parent globe.

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1. In the absence of any internal globules or embryos.
2. In the irregular size of the green granules lining the wall, which, instead of being of a uniform size, are of various dimensions."
slow and gradual." This contraction of vacuolar sponges has since been observed by Cohn in a species of *Protozoa.*

Mr. Buxton sums up the result of his observations upon *Volvox cylindricus*:

1. That it originates in an apparently neculated discoid cell, which is generated in the interior of the parent, and liberated in a perfect stage though not fully matured form, within which are contained similar forms.

2. That the contents of this apparently neculated discoid cell, consisting of a granular material, and refractive amorphous (?) spherules, after a time undergo segmentation, at the same time exhibiting a distinct wall, beyond which is a delineated area of the disc itself, apparently a gelatinous constituent.

3. That this segmentation, attended with a corresponding augmentation in the number of the refractive spherules, terminates ultimately in the formation of numerous continuous particles or segments.

4. That these segments are gradually separated from each other, remaining connected only by elongated processes or filaments, and constituting the ciliated zoospores of the mature *Volvox.*

5. That these zoospores at first are simple masses of protoplasm, containing a transparent nuclear body, and that afterwards they present for a time clear circular spaces, which contract rhythmically at regular intervals; and are subsequently furnished with a brown eye-spot; and at a very early period have thick refractive plates, which arise from an elongated hyaline beak penetrating the parent cell-walls, and exert active movements external to it.

6. That in a concentric plane internal to these ciliated zoospores are placed the germs of future individuals destined to form the next generation.

**VOROSMARTY, MIHALY or MICHAEL, an eminent Hungarian poet and prose writer, was born at Nyére, in the county of Fejervar, called by the Germans Stihisweissenburg, in the year 1800. His father, whom he lost early, was a nobleman. Michael went in 1817 to Pesth to study law, and in 1824 he was admitted as an advocate, but he early adopted literature as a profession. In 1821 appeared his first drama, "King Solomon," founded on the History of King Solomon of Hungary; and in 1824 another drama, "King Sigismund," between which, in 1829, was published his romantic poem of "Triumph of Fidelity." It was as an epic poet that he attained the greatest celebrity: his "Zalan Fatíma," or Flight of Zalan, his "Érzékhajó," and his "Tündéryó," or Enchanted Valley, the first published in 1824 and the last in 1827, are considered the finest narrative poems in the Hungarian language.

For some years Vörösmarty was editor of the "Tudományos és Gyűjtemény," or Repository of Science, a monthly magazine, which lasted under his guidance, and that of others for a quarter of a century, and was during its continuance the chief organ of Hungarian periodical literature. He was afterwards concerned with Bajza and Schedel in the editorship of the "Athenaum," a periodical not unlike the London "Athenæum," which had for a time great and deserved success. In 1830, on the establishment of the Hungarian Academy at Pesth, he was appointed one of its members, and soon afterwards its secretary, and for some years his life flowed in an unbroken course of literary labors and literary fame. In general his reputation stood higher among the educated classes than among the people. The popularity of his lyric poems, the "Szócsat," or Appeal, written in 1840, enjoyed a double success; it rose at once to a strong popularity among the people, like that of the "Marcellina" in France, and to the Hungarian Academy represented the poet with a ducat for every line. Some of the lines of the "Szócsat," the subject of which is the fate and prospects of the Hungarian nation, have since acquired a melancholy increase of significance:

"If there are will, and some there must, To us a better line.
And if it come not, then come Death To our dark night.
And be our country, drowned in blood, Laid on a glorious bier."

It was natural that at the outbreak of the revolution in 1848 the poet of the "Szócsat" should be called on to take a part, and he was elected deputy for the county of Bacsa. His course in the Assembly however was far from meeting the approval of some of the more fiery patriots. The pope and imperialist Pókó, the Hungarian Burna, was so indignant at one of Vörösmarty's votes that in a poetical address to him he renounced his friendship. (Preface, p. 3.) On the last triumph of the Austrians Vörösmarty was brought to trial and condemned as a member of some of the revolutionary committees, but was released and pardoned after a short imprisonment. He however wrote a neat protest piece by him: the calamities of his country, the has been his lot deep melancholy, and lived for two or three years in retirement, without suffering pen and paper to come in his sight. At length, in 1854, his friends roused him in some degree from this state of depression, and he undertook a translation of Shakespeare, some of whose plays he had rendered into Hungarian in happier days. The task was still not completed when Vörösmarty died at Pesth, on the 9th of November, 1856.

An edition of the works of Vörösmarty was issued by his friends Bajza and Schedel as part of the collection of the Hungarian classics, entitled the "Nemzeti Könyvtár," or National Library. It was published in 1847. The divisions adopted for the writings are Lyric Poetry, Narrative Poems, Novels, Minor Poems, Prose, and Miscellaneous Writings in Prose, which are subdivided into Essays on Language and Literature, and Dramatic Criticism. The whole are comprised in one thick octavo volume, printed in double columns, but would occupy nine or ten octavo volumes. Vörösmarty's writings are more distinguished by classical correctness of form than for striking originality of substance. His narrative poems are written in hexameters on the classical model, for which the Hungarian is perhaps better adapted than any other modern language. His lyric as well as his epic poetry is estimated at a high value by native critics; but the very qualities that excite their admiration render their beauty difficult of transfer.
The Australian Alps commence at Wilson's Promontory, and extend into New South Wales by Mount Wellington. In this range rise the Murray and the numerous streams which, flowing southward, fall into the sea and form it into a river, having abundant water all the year round, whilst most of the large rivers which run into the interior become dry during the summer months. Further north, in the Warragong Chain, the Mumurundi beeches with their affluents take its source, and is likewise a perennial river. East and north of this are Yass Plains and the hilly tract inclosing Lake George. The elevated plains extend, under the name of Goulburn and Breadalbane Plains, about 40 miles farther north, to the southern extremity of Coolburn Range, which separates the Great Plains of the South from the Blue Mountains, east of which runs the Shoalhaven river to the sea. Blue Mountains commence in 34° 30' S. lat., and run northwest to the Monndilla Range, in 32° 40' S. lat. From this range the San, the Wollondilly, and the Macdonald rivers, all of which find their way to the sea through the Hawkesbury and Bullen Bay; on the west side descends the Lachlan and its affluents, which join the Mumurundi. The mountains are the highest in New South Wales, and extend to several hundred miles to the north and south of the city of Sydney, and connected with them are the Blue Mountains, which extends still farther to the west. The only part of this range is included between 150° and 151° E. long. which is a considerable portion of the ridge without trees, overgrown with bushes, and grassy; but on the rising grounds are forests composed mostly of apple trees, iron-bark, stringy-bark, and box.

The coast-line on the east extends in a general direction of north-north-east from Cape Howe to Cape Byron, where it recedes a little to the west. There are numerous harbours formed by the mouths of the rivers flowing into the Pacific. The chief of these, proceeding from south to north, are—Two-fold Bay, at the mouth of the Tawambo, immediately north of Cape Green, one of the boldest promontories along the coast; Barmouth, Bateman Bay, Sussex Haven, Gage's Bay, Shoolbroad Haven, Botany Bay, Sydney, Port Jackson, Broken Bay, Port Stephens, Farquhar and Harrington Inlets at the mouth of the Manning and Landows rivers, Port Macquarie, Trial Bay, Shoal Bay at the mouth of the Clarence River, in 30° 10' S. lat., which is separated from the M'urriedl by a headland, with its group of islands extending 70 miles from north to south. In this extent the shore presents every variety of appearance. From Cape Green to Shoalhaven River the cliffs are generally low; from Shoalhaven River, north of 30° S. lat., the distance increases, and the range of bold perpendicular cliffs of sandstone lying in horizontal strata, occasionally interrupted by sandy beaches, the high land retiring to a considerable distance. Numerous sand-hills occur along the remaining part of the coast. Port Stephens is a bar-harbour, so that small vessels only can enter it; those of larger description are compelled to anchor offshore.
outside. In some parts especially north of Trial Bay (30° 50' S. lat.) and south of the month of Clarence River, are tracts of coast many miles in length, where it is rocky and difficult to reach. The harbours are only found at the mouths of the numerous rivers.

**Rivers.—**The larger rivers which drain the country between the Pacific and the watershed have water all the year round. They generally flow in beds which are deeply incised, being several hundred feet deep in the common levels of the country, which rise perpendicularly, or nearly so, from 100 to 200 feet and frequently higher, so that the streams are inaccessible, except at a few places. They are of little use for navigation, irrigation or for transport. The **Shoal Water River,** the most northern and considerable of the rivers of this region, rises on the table-lands east of the Warragong Mountains, and runs about 90 miles northward, measured in a straight line, and then about 40 miles eastward. About 200 miles and its mouth occurs the last rapid, np to which the tide flows. The mouth of the river is much obstructed by shoals and sand-banks. The **Hastings** falls into Broken Bay. It rises under the name of Wollondilly, on the connecting table-lands, and receives nearly all the waters which are collected on them. It flows into a deep bed, sinking into a deep ravine, when it is no longer accessible. The last rapids occur near Windsor, from which place it is navigable for moderate vessels. When it leaves Windsor, the current is not strong, and it has about 100 miles at least following the windings of the river, whose waters are fresh for 30 miles below the town. Its estuary, Broken Bay, is surrounded by rocks, and has several good anchorages even for large vessels, the best of which is called Pittwater. Beyond Pittwater is the course of the river, which is 24 miles, and are measured by the surveyors.

Sometimes the floods of this river rise to 90 feet above its usual level, and the inundations then lay waste the fertile tracts on its banks. **Georges River** falls into Botany Bay. It runs hardly 60 miles, but is navigable for boats from Liverpool, down-wards, a distance of about 12 miles in a direct line, but 24 miles following the windings of its course. **Hunter River** disembogues into Port Hunter. It has two great branches, one called Hunter and the other (Gosford River,) which enters the coast at the bar on the north side of the entrance of the river. The river is navigable for about three miles. The navigation begins at Maitland, about 20 miles from Port Hunter by land, but nearly 40 miles by water, and a steam-boat plies regularly between that town and Sydney. This river often rises rapidly after heavy rains, and in some places to the height of 40 feet.

The navigable rivers which drain the countries north of the Hunter are the Manning, Hastings, Apley, Clarence, and Wallagaraugh. The Manning, and Clarence, fall into Port Macquarie, which is a bar-harbour, admitting only vessels of 100 tons burden, and it is dangerous to enter, except at full tide, on account of the rapid current, which sends vessels ashore upon the shoals on the northern side of its entrance. The bar in the entrance of the river is the largest class, except when the wind blows strong on the shore. Within the bar is secure anchorage for a great number of vessels.

**North of Port Macquarie** is the valley which is drained by the Apley or Mac Leay River, which divides about 12 miles from the sea into two branches, inclosing a large island. The main branch at the northern end forms the harbour of Trial Bay, which has a bar across, having from 15 to 17 fathoms deep in it. This branch of the river has a distance of more than 50 miles from the sea, where farther progress is impeded by a fall, which occurs where the river issues from a narrow glen, whose sides rise 900 feet above its bed. Below this point the river runs through a wide valley, in which there are some plains destitute of timber, and gently-rising hills covered with opening forests and grassy pastures. Farther north is the valley of the Clarence River. **The mouth of the river is at Shool Bay, 29° 20' S. lat.** The river is about 120 miles in length, and considerable in width at high tides. **Brisbane River** falls into Moreton Bay, and is navigable by ships drawing 16 feet of water 20 miles np, at which point a ridge of rocks crosses the bed, but to a distance of two or three miles north the river it may be navigated by some vessels. Several of its tributaries are also navigable for some miles from their mouths. The country on both banks of the river presents an alternation of hills and level tracts. The soil, which is very good, is overgrown with high trees, and coppices of great magnitude. The highest hills lie on the north side of the river, where some rise from 700 to 800 feet. The **farthest sources** of the Brisbane are in the Coast Range, which here offers an easy passage to the interior by a gap which occurs south of the North of Mount Mitchell, which is 4120 feet above the sea.

All the rivers draining the interior of New South Wales, as far as it is known, appear to belong to the river basin of the Murray. The rivers composing this extensive system rise in the Eucalyptus districts of the high lands running north and south through New South Wales. The Murray itself we have noticed as dividing the colony from Victoria, and it enters South Australia at Table-land, 143° E. long., and then running east, flowing for about 90 miles in a direct line, it turns to the south and enters the sea at Encounter Bay. The Murraybridge, after it has itself received the Lachlan, falls into the Murray in 143° E. long. The Darling, by its upper branches, drains the country extending from 22° to 25° S. lat. Its most northern part, the Condamine, rises on the Darling Downs, in 29° S. lat., runs northward as far as 26° S. lat., 151° 4' E. long., then turns westward to 149° E. long., and then south-westward till it joins the Darling on its left bank. From the south-east it receives the Bogan, a considerable stream, rising in the Harvey Range; and it is probable that the Macquarie, at least during the rainy season, disembogues into it part of its water from the marsh in which it is lost.

Geological and account of the geology of the island has been given under **Australia,** S. 2. Sir R. I. Murchison had asserted that gold must exist in the country under certain formations; and the same theory had been promulgated in the colony by the Rev. W. B. Clarke, who, on the 19th February, 1860, stated that for 60 miles of the river running north and south through Victoria and New South Wales, were of the same formation as those of the Sierra Nevada in California, and the Ural Mountains in Russia, namely, granite, with gneisses and schistose slate; but it was not till 1849 that the actual existence of gold was discovered. In 1861 further discoveries were made, Mr. Hargraves disclosed the places where he had found gold, and when the government officer was sent to examine the places, he was found to be in the correct. Numerous licences for constructions were given by the governor to grant licences to diggers at 30s. per month. The first discoverers obtained the gold by washing the detritus from the beds of the creeks, and the earth from the shores; but it was soon found that the richest deposits were in the quartz, and means were found to crush the rock and obtain the gold. On August 5th the governor issued a notice that the licences would only apply to the gold-washers, and that on gold obtained by this method only a royalty of 5 per cent, would be charged. A royal commission was appointed to inquire into the matter. policemen were appointed to the various stations, and escorts furnished for bringing the gold from the diggings to the ports of Sydney or Melbourne. In a short time the towns and villages were deserted, all the usual avocations abandoned, and the roads of the colony became deserted. Twenty men on public labour repaired to the diggings. An immigration ensued almost without a parallel.

Respecting other metals we have little to add with what is said under **Australia,** S. 2.

**Iron-ore is known to exist in several places, especially on the west of Blue Mountains. Several extensive coal-measures have been found, two of which are worked. Those found near the mouth of the Hunter River, near Newcastle, are extensively wrought, and their produce is shipped to Sydney. The coal-beds near Western Port are also very large, and have been worked for several years. Limestone is abundant in some places, and some kinds of marble are worked on the banks of the Wollondilly.**

**Soil, Agriculture, and Agricultural Productions.**—The soil of so extensive a country must necessarily vary greatly. Many parts are distinguished for their fertility, and it is probable that at least one-fourth part is well adapted for culti- vation. The most extensive portions of the country are very suitable for sheep and cattle. In addition to the various species of grain and artificial European fruits and vegetables, that succeed well in various places, the sugar-cane, the vine, and tobacco are raised. Although the growth of grain has been constantly increasing and the production of grain has increased in the exporting country, and the influx of population in consequence of the discovery of the gold-fields must render it for a consider- able time still more so. The colonists have been at some pains to introduce many kinds of fruit-trees and vegetables, and they have in most cases done it with tolerable
success. There are oranges, lemons, citrons, nectarines, apricots, peaches, plums, cherries, figs, quinces, pears, apples, mulberries, pomegranates, grapes, raspberries, strawberries, bananas, gooseberries, pineapples, gooseberries, currants; almonds, walnuts, chestnuts, and hickory nuts, which have been introduced from England, and the wool was of indifferent quality; but as soon as it became evident that wool might become a source of wealth, and yield an important article of export to the mother country, several landed proprietors were at considerable expense introduced. They are fine large animals. In some parts, especially on the Plains of Bathurst, the dairies are well attended to, butter being made to a great extent, and also cheese not inferior to the common cheeses of England. Bullocks are mostly used for draught. The horses are remarkably hardy and can undergo great fatigues. Pigs find abundant food in the uncultivated tracts, and are easily fattened with maize. Goats have been introduced, and thrive amazingly in those parts which have a hilly country.

Poultry is in great abundance: geese, ducks, turkeys, guinea-fowls, and common fowls thrive surprisingly, without any particular care being taken of them.

Industry and Manufactures.—The manufacturing industry of this colony has made considerable progress, though the production and export of native commodities form the staple of the occupation of the inhabitants. The most numerous manufacturing establishments are the mills for grinding and dressing corn, turned without water, horses, or steam. There are also manufactories of woollen-cloth, hats, soap and candles, and of articles of furniture; distilleries, breweries, iron- and brass-foundries, rope-yards, and ship-building yards. As spermaceti-whales and black whales frequent the sea adjacent to the eastern entrance of Bass's Strait and the strait itself, and a great number of seals are found on the islands in the same part of the sea, the whale and seal fishery became a source of gain to the colonists, and is still carried on, though it has fallen off considerably.

Commerce.—New South Wales, considered as a commercial country, holds a very high rank among our colonies, if its population is taken into account. Including the large quantities of wool, tallow, hides, and sheep-skins, Great Britain sends an average of 3,000,000 to the value of 4,060,196; and exported articles to the value of 6,981,002. These amounts have decreased in the years 1856 and 1857, but are still very large. Considerable quantities of gold also pass through Sydney.

The other counties do not occupy the whole of the districts, nor do the districts occupy the whole of the territory, but it is a regulation of government that no land can be sold beyond their limits. The extreme boundaries of county lands have come therefore to be called the boundaries of our colonies. Since the discovery of these lands, a different system is followed in the management and civil government of them.

Within the boundaries the whole country is divided into police districts, each having a bench of petty sessions in a magistrate; and these districts which are of unequal size, there are at present about 40. Beyond the boundaries the country is also roughly divided into districts, in each of which there is a commissioner of crown lands, who is the chief officer. In 1817, Captain John Lawson, Mr. Windsor, Mr. Mitchell, and Dr. Leichhardt, who, leaving New South Wales, reached the Gulf of Carpentaria, and who, on a second journey, lost his life in the interior. The results of their discoveries have been given in the geographical notices of Australia and of the several colonies.
Blue Mountains, situated on the upper part of the Macquarie. It derived its importance at first from being the chief place of trade of the rich pastoral, Bathurst, Plains, which surround it. It has since become of still greater importance from its vicinity to the gold diggings of Ophir, which lie from 20 to 30 miles west from it. Boyd, or East Boyd, as it is sometimes called, is a small but fine portion of the southern border of the colony, on the mouth of the river Towamba, which here falls into Twofold Bay. Brisbane is at the northern extremity of the colony, situated on the river Logan, the principal river of the province. It is a flourishing town, in an agricultural district. Tobacco and wine are produced. Campbelltown is on the coast, about 20 miles S. from Sydney, and has considerable trade and manufactures, particularly of leather. Liverpool is about 16 miles W. from Sydney, and is a coasting town, being an inland town, surrounded by a rich and well cultivated country, which secures it much retail business. Macquarie, or Port Macquarie, is a small but increasing town, at the mouth of the river Hastings, which a little higher up receives the Wilson and Maria rivers, and forms a tolerably safe bay. It is about 120 miles N. from Hunter River. Maitland is on the right bank and about 40 miles from the junction of Hunter River, at the junction of the Walls creek. The river is navigable for many miles.

The following table will give an idea of the different parts of the colony:

<table>
<thead>
<tr>
<th>District</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remnik Sarai</td>
<td>111,342</td>
</tr>
<tr>
<td>Buzco</td>
<td>157,645</td>
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<tr>
<td>Sacenicu</td>
<td>121,250</td>
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<tr>
<td>Podrova</td>
<td>130,434</td>
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<tr>
<td>Humbolde</td>
<td>115,597</td>
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<td>Muscelu</td>
<td>125,348</td>
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<td>Arges</td>
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<tr>
<td>Remnik Valcea</td>
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<td>Mehedinti</td>
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<tr>
<td>Tele-eroman</td>
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<td>Viace</td>
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<tr>
<td>Ilaoa</td>
<td>175,000</td>
</tr>
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<td>Israels</td>
<td>95,606</td>
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</tbody>
</table>

Moldavia is divided into Upper Moldavia, or Terna-de-Sues, which is subdivided into 6 districts, and Lower Moldavia, or Terna-de-Shoss, which is subdivided into 7 districts. Each district is governed by an officer called Ispravniks.
WALLICH, NATHANIEL, M.D. and Ph.D., F.R.S.

London and Edinburgh, a celebrated botanist, was born at Copenhagen on Jan. 28th, 1786. He commenced his botanical studies under the direction of Professor Vahl, and went to India in 1801, and in one-and-twenty years of constant employment in that country he achieved an admittance to the academic and practical bibliography of the University of Copenhagen.

In 1815 he was nominated to the temporary charge of the Botanic Garden at Calcutta, which appointment was subsequently renewed, and in 1823 he was appointed Superintendent of the Garden. He was the first to introduce a printing-machine in Botany, and his publications were embellished with fine engravings of plants and flowers. The Journal of the Asiatic Society of Bengal is largely indebted to Dr. Wallich's exertions for its completeness. He has collected more than 12,000 plants, and many of the varieties he has introduced have contributed towards the flora of India.

Dr. Wallich's exertions during the thirteen years that elapsed before his first return to Europe added greatly to the extent and value of the previously extensive collections of this naturalist, without a rivalling the magnificent quantity of hitherto unknown and beautiful plants. In 1830 Dr. Wallich made a botanical excursion to Nepal, in the course of which he collected a great variety of plants, many of which he forwarded to London. A severe fever, caught in his descent to the plains, confined him to his bed for two months and compelled him to seek benefit from a voyage to Penang, Singapore, and some other places in the Straits of Malacca, from which, after an absence of five months, he returned to Calcutta in 1832. Rich in collections and with renewed health. In 1824 he published the catalogue of a selection from his Nepal collection, under the title of 'Tentamen Flora Nepalensia Illustratum,' of which two numbers, containing 20 plates, were published in 1830. He was then invited to attend the kettle, and the increase of the Botanic Gardens of England, and to become chairman of the Botanical Society of London. At this time he completed his work, entitled 'Plantae Asiaticae Rariores,' consisting of 300 beautifully executed coloured plates. In 1833 Dr. Wallich returned to India and resumed the charge of the Botanical Garden, which he had left 14 years before. In 1837, the first number of the journal of the Botanical Society of London was published, and in 1839 the whole of the society's transactions were published. Dr. Wallich was a member of the British and Foreign Antiquarian Society, and a fellow of the Linnean Society. He was a man of warm affections, ready wit, and pleasing manners, and devoted to his attachment to his favourite science. He must not be forgotten that he did more than any one else to introduce the gardens and greenhouses of England the beautiful and luxuriant plants of India, and it is from his collections and descriptions, and presentations to our public and private gardens, that we are indebted more than to any other source for our acquaintance with most of the plants that are found in England.

He died at his house in Upper Gower-street, London, on the 28th of April 1854, in the 69th year of his age.

WALTER, JOHN, late manager and principal proprietor of The Times' newspaper, was born in 1764. His father, John Walter, who was born in 1739, was known as the merchandising printer, from his having obtained a patent for an invention named Logography, or the art of printing with entire words, their roots, and terminations, instead of the letters of the alphabet. He was also a manager of the Koenig printing-office in the Strand, and it is on record that he published the first number of The Times,' and was during fifteen years printer to the Board of Customs, but that employment was taken from him about 1806, in consequence of the West Indian Act. Sir Richard Grenville, a former Lord Melville's administration at the Admiralty, he died November 16, 1812, at Tweddington, Middlesex.

The late John Walter became a joint proprietor and the exclusive manager of 'The Times' at the commencement of the year 1803. It would not be easy to describe the improvements which were made in 'The Times' under his management. The magnificent sums paid to the editor and to those literary gentlemen of the highest class who furnished the leading articles, the large staff of reporters at liberal salaries for parliamentary debates, law proceedings, and public meetings, the large amount and accuracy of information, the almost universal correspondence, the competition with the government for priority of intelligence, the distinct arrangement of the whole matter, the firmness of power for the printing, and the marvellous rapidity with which the whole is produced, have raised 'The Times' to a position of social and political importance in which it is unparalleled in Great Britain and in Europe.

The invention of the printing-machine, and the steam-engine as a moving power have produced so great a revolution in the process of printing, as to require a brief statement of the origin and progress of the invention. As early as 1804 an ingenious combinator named Thomas Martin had made the model of a machine for printing, which met with the approval of Mr. Walter, who expended a considerable sum in the attempt to complete the machine; but his health endangered his funds, and his father, who had hitherto assisted him in the business, was unable to support the attempt was abandoned. About the same period Mr. Kenig, a native of Germany, had made some progress in the contrivance of a machine for printing. Having met with no encouragement from the scientific world, he, who was invited to Mr. Bensley's well-known printing-office, was being satisfied as to the feasibility of the projected improvement, supplied the necessary funds. An ingenious assistant of the name of Baner was also engaged, and the work proceeded till the invention was completed. Baner, who was losing the sale of his additional funds, invited the late Mr. George Woodfall, and Mr. Richard Taylor, both well-known printers, to join him and Mr. Kenig in taking out a patent, which they did, the machine even then being so far advanced as to satisfy them as to the prospect of success. The improvements in the specifications were patented March 29, 1810. It was taken out in the name of Frederic Kenig, and was assigned by articles of partnership to the firm of Baner, Kenig, Woodfall, and Taylor. Mr. Kenig states (The Times, December 8, 1814) that "about the first of the New Annual Register" for 1810, "Principal Occurrences," was printed by machine, and it is, I have doubt, the first part of a book ever printed by a machine. The machine was set to work regularly in April, 1811. Another patent for a machine on an improved plan was taken out October 30, 1812. It was completed in December that year, and printed about 600 copies an hour. A third patent for another improved machine was taken out July 25, 1813. Mr. Kenig's patent for a printing machine in 1814 was in fact being independent of the motive power. Mr. Perry, of the Morning Chronicle was applied to, but declined to purchase a machine. Mr. Walter, however, according to the instructions of Mr. Kenig, took one of the specifications, and gave an order for two machines, which were to be worked by the power of a steam engine. Notwithstanding violent opposition from the pressmen, the machines were completed on adjoining premises, and on the 29th of November, 1814, 'The Times' was printed for the first time by machines worked by steam-power. The number impressed in the hour was then about 1100. Great improvements have since been made by the late Professor Edward Wodder and others, in the machines for printing books as well as newspapers. About 12,000 copies per hour are turned out by 'The Times,' and the total number per day is upwards of 50,000.

Mr. Walter married in 1818. Having purchased a fine estate in Berkshire, he became a candidate for the re-presentation of that county in Parliament, and was returned. He was re-elected in 1835, but in 1837 resigned his seat in consequence of the opinions of the majority of those who had elected him being opposed to his own on the question of the new Poor Laws. In 1840 he offered himself for the borough of Nottingham, but was defeated. He returned for the borough of Nottingham, and at the general election the same year announced himself as a candidate, but in consequence of serious rioting, withdrew half an hour before the poll. He died July 28, 1847, at his residence, Printing-House Square, London.

WARBURTON, ELIOT BARTholOMewGEORGE, eldest son of the late Major G. Warburton, of Aughrim, county Galway, Inspector-General of Constabulary in
Ireland, was born in 1800: he represented a branch of an old Cheshire family. He received his education at home, and under the care of a tutor; then entered Queen's Col-
lege, Cambridge, but after his second term he migrated to Trinity, where he took his degree. He was subsequently
called to the bar, but soon ceased to practise, and turned his affairs to the profit of the law, and the imme-
readly valuable theme to his life, he first became known to the world as an author by his captivating work on the East and Eastern Travel, entitled the 'Crescent and the Cross,' which was first published in 1846. This work was at once admired in the West, and in the East, and its second edition (1848) in the 13th edition. It was followed in 1849 by his 'Prince Rupert and the Cavaliers,' a brilliant history and vindication of the gallant prince, to which the chivalrously distinguished himself in the civil war under Charles I. He was known as Mr. W. Hartopp; his father was a distinguished public servant, and a second son. After the reformatory and illustrative period of the 18th century. Shortly afterwards he wrote the Memoirs of Horace Walpole and his Contem-
poraries.' His last work, which was published after his death, is entitled 'Darien, or the Merchant Prince;' it is a tale founded on the colony established about the middle of the 18th century by a Scottish adventurer named Paterson, on that portion of the northern coast of South America which abuts on the Isthmus of Panama, and is known by the appel-
lation of Darien. The novel was followed by another, the Life of the late E. Grove, Esq., of Shenton Park, Staffordshire, and niece of Sir E. Credock Hartopp, Bart., by whom he left two sons. He was lost in the ill-fated ship Amazon, which was burnt off the Land's End, January 4, 1822. He had married Miss Mary Turner, daughter of Mr. John Ward, a Spanish merchant resident at Gibraltar, who had married a Miss Raphael, a Spanish Jewess; and was born on the 19th of March, 1765. He was educated at a small school, and a grammar school, and was a pupil of Dr. Cyril Jackson. He was called to the bar at the Inner Temple in 1790. Having gone the Northern Circuit without much success, he secured employment in cases before the Privy Council. In 1805 he was appointed by Mr. Pitt, then one of the English judges, a special under-secretary for the Foreign Department, and was retired from the legal profession in order to undertake the more congenial duties of under-secretary of State for Foreign Affairs. From 1807 till 1811 he was a Lord of the Admi-
ralty under the late Lord Melville and the Right Hon. Charles Yorke; he served the office of Clerk of the Ordnance from the latter date till 1823, when he was appointed one of the auditors of the Civil List— a post which has since been abolished. He served as high sheriff for the county of Hertford in 1832, and for many years held a seat in parliament, which he entered in 1802 as member for the borough of Cockermouth, and subsequently for the disfranchised constituency of Hazlemere. Amongst all his political and literary labours, Mr. Ward found time and leisure for the composition of several works of political and historical interest. Of the former, the best known is his 'History of the Law of Nations in Europe from the time of the Greeks and Romans to the age of Grotius,' which was published in 1795, and was principally written during his breadth of mind, and sense of principle. Of his novels, 'Tremains' and 'De Vere' are those which have attained the widest circulation. The former was published anonymously in 1826, and the latter in 1827. His other works are— an Inquiry into the Con-
duct of European Wars,' 1803, a pamphlet which first en-
listed on his side the patronage and favour of Pitt; 'Illustra-
tions of Human Life,' 1837; 'Pictures of the World,' 1838; 'Historical Essay on the Revolution of 1648;' 1858; and, lastly, 'De Clifford,' a novel, published in 1841.

From the middle of 1809 till late in life Mr. Ward kept a political diary, which has since been published down to the year 1851. It is valuable as an historical document, and as throwing some light on the state of things under the Per-
cival and Liverpool administrations. Mixing largely with the world of politicians, and being equally skilful in gather-
ing and prompt in recording the gossip of the day, Mr. Ward was enabled to give to his records just the facts which really cur-
rented in London. 'The Diary' is at present withheld from publica-
tion, owing to the warlike nature of its purpose, and the severity of its comments on living statesmen. The 'Diary' will be found in the 'Memoirs of the Political and Literary Life of Robert Plumner Ward, Esq.,' published in 1850 by his friend and relative the Hon. Edmund Phillpotts, 2 vols. 8vo. Mr. Ward was twice married: first, in 1798, to a daughter of C. J. Maling, Esq., by the Dowager Countess of Mulgrave; secondly, in 1828, to Jane, daughter of the Hon. and Rev. George Hamilton, son of the seventh Earl of Ahermon (by whom he had a son, Robert, and two daughters, Misses Hamilton). He had the fortune to see nearly all his children carried off by consumption, with the exception of his only son by his first wife, now Sir Henry George Ward, governor of Ceylon. He died at Ockever Hall, on the 13th of August, 1846.

RALPH, D.D., was born at Dalkeith, in the county of Mid-Lothian, Scotland, on the 22nd of De-
cember, 1779. His father, William Wardlaw, was in business as a merchant, his mother, Anne Fisher, was daughter of James Fisher, and great-granddaughter of Ebenezer Erskine, two of the founders of the Scotch Secession Church. Ralph received his early education at the public schools of Glasgow, to which city his parents removed shortly after his birth. He entered the University of Glasgow in October, 1797, and was graduated in the university of Edinburgh as a doctor of divinity in 1798. He was elected an M.R.C.S., and a member of the Royal College of Surgeons of Edinburgh, in 1798. He was elected to the presidency of the University of Edinburgh in 1799, and was returned for the sheriffdom of Mid-Lothian, in 1799. The discipline of the University of Edinburgh was at this time under the charge of Dr. John Burns, who was then a young man, and was elected to this chair by the students in 1798. He entered the University of Glasgow in October, 1797, and was graduated in the university of Edinburgh as a doctor of divinity in 1798. He was elected an M.R.C.S., and a member of the Royal College of Surgeons of Edinburgh, in 1798. He was elected to the presidency of the University of Edinburgh in 1799, and was returned for the sheriffdom of Mid-Lothian, in 1799. The discipline of the University of Edinburgh was at this time under the charge of Dr. John Burns, who was then a young man, and was elected to this chair by the students in 1798.
times, he bestowed 18,000£, and he contributed largely for church purposes, particularly in his own county of Gloucester, and in Nova Scotia. He founded an hospital at Leamington, which bears his name; and one for lunatics on Headington Hill, near Oxford. To King's College in London he presented anonymously several donations of 500£ each; but to Queen's College, Harrow, the proceeds of his contributions was upwards of 25,000£. This institution was commenced by Mr. Sands Cox as a school of medicine, and Dr. Warneford literally afforded pecuniary assistance, through inducing him to extend the school to a college, which was ultimately patronised by royalty. When it was found desirable to add other departments of education, Dr. Warneford was again the chief contributor; and desirous that religious instruction should be afforded, he founded the college with the desire of promoting the reading of the sacred books and the study of the humanities and the liberal arts. In 1844, in recognition of his wide-spread beneficence, the bishop of Gloucester conferred upon him an honorary canonry in Gloucester Cathedral; and in 1846 in a state of health he was erected to the Warneford Lunatic Asylum at Oxford, the expense being defrayed by public subscription. He died at Bournon on January 11, 1855, enjoying good health till within a few days of his death. He bequeathed 2000£, to the Christian Knowledge Society, to be employed for the Propagation of the Gospel, in addition to previous gifts.

WART-CRESS. [Sennabria, S. J.]

WARWICKITE. [Mineralogy, S. 1.]

WASHINGTON, a Territory of the United States of North America, bounded by 49° N. lat., 110° 30' and 124° W. long. It is bounded E. by the Rocky Mountains, which separate it from the Territory of Nebraska; N. by the parallel of 49° N. lat., which separates it from the Territory of Oregon; and W. by the parallel of 45° N. lat., which is the boundary of the Territory of Oregon. The area is 123,022 square miles. The population in 1857 was estimated at 10,000. At the Census of 1850 Washington formed a part of the Territory of Oregon, which contained 13,294 inhabitants. The county separated in order to form a separate state in 1853, and was organized as a Territory of Washington, then contained less than 2000 inhabitants, exclusive of the native Indians, who probably number about 7000 or 8000.

In its general character Washington has a marked resemblance to Oregon. The surface is greatly broken, it being traversed from south to north by three parallel ranges of mountains, the northern prolongation of the Oregon ranges, while the Rocky Mountains, as in that Territory, form its southern boundary. The chief disagreeable feature is the residue of Columbia to the entrance of Gray's Harbour, or, as it was named by Vancouver, Whidbey's Bay, a distance of 46 miles, is rocky and almost unbroken. The entrance to Gray's Harbour is about 24 miles across, but the harbour itself extends to a width of 12 miles, and is 12 miles deep. It affords well-sheltered anchorage in some places, but it is everywhere encroached on by sand-banks, and its mouth is obstructed by a bar, which only admits the passage of vessels drawing under 10 feet of water. From Gray's Harbour to Cape Flattery, or Cape Disappointment, a lofty promontory at the southern end of Juan de Fuca Strait, a distance of about 80 miles, the coast is high, rocky, and only broken by two or three unimportant streams. The Strait of Juan de Fuca, which forms the northern boundary of the coast of Washington, is a vast arm of the sea, about 10 miles wide at its mouth and 100 miles deep. [Vancouver Island, S. 2.] The southern coast consists of perpendicular sandy cliffs of moderate elevation, from which the land gradually rises towards the sea. The entrance of the strait is about 5 miles from the mouth of the strait is a long low sandy point which forms a good anchoring-ground; and beyond this is a deep bay about 9 miles across, and 3 miles from its eastern point is Protection Island is named by Vancouver from its position at the entrance to Port Discovery. Immediately beyond Port Discovery is Port Hudson, an equally safe and good though somewhat smaller harbour: Vancouver and Wilkes unite in describing these as among the very finest harbours on the whole coast of the north-west. From this harbour is a deep inlet named Admiralty Inlet, which soon divides into two arms—the smaller one named Hood's Canal, bearing to the south-west, and stretching far into the interior; while the main arm proceeds due south for about 80 miles, where it terminates in two smaller named Puget's Sound.

Both these branches afford good anchorage; but Puget's Sound is broken by several inlets, and affords the
The greatest possible security and ample space. Vancouver speaks of these harbours and the contiguous country in such terms as might suggest the suspicion that he had been carried away by the ardent feelings of a discoverer; but Mr. Wilkes, the commander of the U.S. Exploring Expedition, fully corroborates all that Vancouver has said. He says, the

"there is nothing can exceed the beauty of these waters and their safety: not a shoal exists within the straits of Juan de Fuca, Admiralty Inlet, Puget's Sound, or Hood's Canal, that can in any wise interrupt their navigation by a 74-gun ship. I very often think there is nothing in the world that possesses waters equal to these." It is around Puget's Sound that the commerce of the Territory is chiefly establishing itself. Numerous settlements have been already formed along its shores. The tide rises 18 feet in Puget's Sound. The Sound is full of islands, and receives several small rivers.

Like Oregon, this Territory is naturally divided into three nearly parallel districts, determined by the course of the mountain ranges: a western, or coast section; the middle section, lying between the Cascade and the Blue Mountains; and the Rocky Mountains section. The western section lies between the Cascade Mountains and the sea, and is much broken in surface, being intersected by spurs from the Plateau, and the greatest part of it is covered with forests of lofty pines; firs often occur from 200 to 300 feet in height, and of corresponding girth, and some of the pines rise to a height of 200 feet without a branch. The most prevalent trees besides pines are firs, oaks, and aspen, and on the higher points, growth of hazels, roses, &c. The hills are generally of basalt, and some, like Mount Olympus, near Joan de Fuca Strait, are of considerable altitude. The soil is in parts a light brown loam, in others a light vegetable mould with a sand, or shell, or mud bottom. Generally, the soil is of good fertility. The river-bottoms afford good farming-land, the prairies and the uplands excellent pasture-ground. The climate is mild and salubrious, though somewhat moist; the winters are temperate, and snow seldom lies long on the ground. Game abounds.

The Cascade Mountains continue, as in Oregon, in a generally northern direction, and about 150 miles from the coast. Their highest cones rise to an altitude of upwards of 13,000 feet, and they form a barrier of very difficult passage between the western and middle sections of the territory. The country between the Cascade and Blue Ranges is wider than the corresponding district in Oregon. Between the Snake and the Flathead or Clarkes rivers, and between the ranges of the Salmon and Cowlitz, nearly 200 miles in length and 100 miles across in its widest part. The soil is araceous, and the country little fitted for tillage; but the plain is covered with a good grass, and is well suited for immense flocks and herds. The river-bottoms have little soil, but generally productive. The hills are comparatively bare of wood, and infertile. The climate of this middle section is cooler, drier, and more salubrious than in the western section; but the variability of the climate is much greater. No dew falls here. The Blue Mountains are considerably broken and interrupted, but generally run north and south. The country east of them to the Rocky Mountains is interrupted throughout by offsets from the Rocky range, and transverse ranges connecting the main chain. Nothing can well exceed the wild magnificence of much of this country, with its vast and snow-clad mountainous tracts, deep valleys, tremendous gorges, lofty catastra, and rushing torrents. It is of course little suited for agricultural operations, but the bases of the hills and the valleys are excellent for grazing. The soil, which from which flow the head streams of the Columbia, the Spokane, and the Flathead rivers, are spots of remarkable fertility as well as of surpassing beauty. But all this district, as also the Indians, who are a warlike and implacable race. The chief distinction of the Indian tribes is on hunting, and they barter the furs to the servants of the Hudson's Bay Company for tobacco and articles of European manufacture; but the fur-bearing animals are rapidly diminishing. There are three or two practicable passes in this range along the territory of Washington, but they are much more difficult than the Great North Pass.

The principal river in the Columbia, which belongs equally to Washington and Oregon; it is described under Columbia River. Its northern branches rise in the Rocky Mountains within the Hudson's Bay Territories, and unite in Washington; the united stream traversing the Territory in a generally southern direction, and receiving numerous tributaries. It forms the Columbia by the junction of the Saphin or Lewis rivers. The principal tributaries of the northern branch of the Columbia are the Kootanai or Flat Bow, the Flathead or Clarke, and the Spokane rivers: they are all very rapid streams, but navigable by boats for some distance. The chief river north of the Columbia is the Chehalis, which rises in the mountains west of the Coast Range, and pursues its very tortuous course to its outfall in Gray's Harbour. Its course is very rapid, and it is only navigable by canoes; it receives several small streams from the high grounds about Hood's Canal and Puget's Sound. The Nichols and Tenaliqui, or Tenaliqui river, is a very rapid stream, but not navigable for some distance, but will probably prove of greater value for their mechanical power. In the interior are numerous lakes, the larger being chiefly expansions of the northern branches of the Columbia, the Spokane, and the Clarkes.

At present the breeding of horses and cattle has attracted most attention from the settlers, but agriculture is rapidly extending. The productions are similar to those of Oregon. Wheat is the chief grain crop; maize has not been much cultivated. The soil is of a generally clayey nature, and affords an unlimited quantity of fine timber. Coal is found in the neighbourhood of Puget's Sound, and near the Chehalis and Monticello rivers. Iron and other metals have been found; but mining operations have as yet been little heeded. A few United States settlers have been engaged in the dense forests of the Territory, and probably will become an important part of the industry of Washington. All the rivers abound in fish; salmon being especially abundant. Fish also abound on the coasts. Whales frequent the coasts and the mouth of Juan de Fuca Strait. Nothing has hitherto been discovered by the climate of Washington that would be likely to prevent the effluvia of Olympia, on the right bank of the Tenaliqui or Shute's River, at its entrance into Puget's Sound. This town boasts of its hotel, store, saw- and grist-mills—the first in the Territory—newspaper, &c.; and contains 300 inhabitants. The town of Hood's Mouth, on the right bank of the Columbia is, below Fort Vancouver; Monticello, the capital of Lewis county, and the place where the convention was held which led to the separation of Washington from Oregon; Ninimock, on the east bank of the Columbia, 6 miles below the city of Columbia, has 14 inhabitants; and Pacific City, on the right bank of the Columbia at its entrance into the Pacific Ocean, which contains 120 inhabitants. The Territorial Assembly consists of 12 members, for three years, but one-third to vacate their seats each year; and a House of Representatives of 18 members, elected annually. The governor is appointed by the president and senate for four years. All laws passed by the legislature must be submitted for confirmation to Congress. No law can be passed interfering with the primary disposal of the soil; or taxing the property of non-residents higher than that of residents. Sections 16 and 36 in every township are devoted to public and school purposes.

(Vancouver; Wilkes; Lewis and Clarke; Fremont, &c.; Gazetters of United States; United States Census; American Almanac, &c.)

WAT

WAT-N.W. FOOT. [Ranchoin, S. L]

WATER-FLY. [Byrines, S. S]

WATER-MELON. [Cowper]

WATER-MILFOIL. [Myriophyllum, S. L]

WATER-PEPPER. [Elatinae, S. L]

WATER-PODS. [E. S.]

WATER-SHIELDS. [Hydrophyllum, S. E.]

WATT, JAMES, the eldest son of the celebrated James Watt, was born on 5th of February, 1769, and died, unmarried, at his seat, Aston Hall, in Warwickshire, near Birmingham, on 7th June 1788. Mr. Watt had early directed his son's attention to natural
philosophy and as a practical study of mineralogy. It is scarcely known, and has not been recorded in any previous biographical work, that he was a man of science and a practical engineer. He was one of the secretaries of the Literary and Philosophical Society of Manchester, then just founded, one of the earliest, and perhaps still the most distinguished of the provincial scientific associations. To the 'Memoirs' of this society be Mr. James Watt, who, on the 21st of June 1823, in a humorous sketch, gave an account of the discovery of the carbonate of barytes at Angl-zark, he was the first to describe, in the paper here indebted, to the circumstances which attended its occurrence, and to make known the fact that the specimen examined and the analyses of the mineral from which it was prepared the aurate, which had been recently introduced into medical use by Mr. Adair Crawford, F.R.S., had been obtained from that locality. He also were some of the earliest experiments on the poisonous effects of the combinations of barytes.

A remarkable episode now occurred in the life of the young philosopher—for such, at this period, we may call him. Mr. Watt had directed his son's attention to the study of science on the Continent, and accompanied him, Thomas Cooper, the vice-president of the Manchester Society, and who afterwards became professor of chemistry in Columbia College, in America—was proceeded to Paris. But here, carried away by the passions of the time, he became a convert to the cause of liberty, he sympathized with the Girondists and Jacobins, and even took some open and avowed part in their earlier tumultuous agitations, in company with Cooper, and subsequently with Wordsworth the poet also. Southey has recorded, from the information of Mr. James Watt himself, that so highly was he at first regarded by the French leaders, that he was the means of preventing a duel between Danton and Robespierre. A more public exhibition of zeal in the cause which he espoused, in which Cooper also took part, was that of the celebration of the jubilee of the Declaration of the Rights of Man. The licence and excesses of the revolutionary parties however opened the eyes of the young enthusiast to the real nature of the principles he was supporting, and he then endeavored to mitigate as far as possible the violence which he foresaw he must in future deplore. This became eventually the cause of his quitting Paris and abandoning his French associates and their objects; for Robespierre, at the club of the Jacobins, inculminating that Cooper and his compatriots were emissaries of the English ministry, indignantly silenced his formidable antagonist from the tribune in a brief but impassioned harangue, delivered in excellent French, carrying with him the feelings of the rest of the room. Returning home he learned that he was no longer safe for a day, instantly left Paris, succeeded with difficulty in making his way to the south, and did not rest until he arrived in Italy.

Not long afterwards he returned to England, and in 1794, as already intimated, began to be actively engaged as a partner in the management and direction of the steam-engine factory at Soho, which necessarily withdrew him from political and also from scientific pursuits, strictly so called, and what he effected in the latter has almost escaped notice.

Mr. James Watt took a part in the progress of steam-navigation, especially as regarded the requisite adaptations in the construction of the engines, not unworthy of his name and of the reputation of the firm of which he became the leading partner. Mr. Henry Bell of Glasgow, who had in 1813 taken the enterprising step of himself trying, in Scotland, at his own risk and under his sole direction, an experiment similar to that which, in the hands of Fulton (whom he advised), had succeeded, so with the help of several steam-vessels propelled by engines of his own construction. Among these was the Caledonia, of 108 tons and 32-horse power, which was launched in 1815, but from defects inherent in the principle, had to be taken to Rotterdam for repairs and alterations. "After her return to the Thames in the spring of 1818," it is stated by Mr. Muirhead, to whose Memoir we are indebted for these particulars of the history of steam-navigation in this country, "Mr. James Watt may be considered as the author of several series of experiments with her on the river (the whole number of those experiments amounting to 250), which resulted in the adoption of many most material improvements in the construction and adaptation of marine engines, and in an immense, though gradual extension of the branch of the manufacture at Soho."

The marine engines manufactured there down to the year 1854, "were in number 319, of 17,438 nominal, or 55,314 real horse-power."

Some forty particulars of Mr. James Watt may be gleaned from the two later publications of Mr. Muirhead. He wrote, in 1823, the Memoir of his father in Macvey Napier's Supplement to the 'Encyclopaedia Britannica' (subsequently transferred, in substance, to the seventh edition of that work); and in 1846 he addressed a letter to Mr. Muirhead on his father's claims as to the composition of water; which is prefixed to the 'Correspondence' of the latter on that subject. The publication of his father's specifications, and the patents and documents relating to them was originally designed and, to a considerable extent, prepared by him; but, from the infirmities of age, confided prior to his decease to Mr. Muirhead, by whom it has been accomplished in the work already cited and described.
The Dover Railway traverses the beds of the Wealden between Red Hill and the branch-line to Timbrough Wells, exposing the Weald Clay and Upper Hastings Sands. The fossils of this group area follows:—

**Planar**

- *Coryphites Mandelli.*
- *Chlorippus Mandelli.*
- *Endogenites croa, Mant.*
- *Equipectes Lyelli, Mant.*
- *Lonchorhates Buttoni, Preal.*

**Insecta**

- *Carabæus elongatus, Brod.*
- *Corydylus striatus, Brod.*
- *Acheta Sagitticula, Brod.*
- *Dilata Stricklandi, Brod.*
- *Cicada maculata, Brod.*
- *Ricinia fulgens, Brod.*
- *Anira Egononta, Brod.*
- *Aphis Melanaria, Brod.*
- *Cydas, one species.*
- *Pholidophorus, one species.*

**Crustacea**

- *Grapsus bulax, Sow.*
- *Cyclops, 5 species.*
- *Conchoera Dinorhina.*
- *Corbula alata, Sow.*
- *Cymatium, 12 species.*
- *Mytilus Lyelli, Sow.*

**Monomorpha**

- *Gryphaea bulbifera, Sow.*
- *Oreis distorta, Sow.*

**Gasteropoda**

- *Actaea Poppei, Sow.*
- *Bulla Manciniana, Sow.*
- *Murellus, 2 species.*

**Pisces**

- *Acroclis Hirundo, Ag.*
- *Hypobus, 6 species.*

**Osteichthyes**

- *Heterocephalus mastodonius.*
- *Osteopoecilus presiculatus, Ag.*
- *Lepidota, 3 species.*
- *Pholidorhynchus ornatus, Ag.*

**Placoidae**

- *Platysomus mandelli, Owen.*
- *Chelon a, 2 species.*
- *Gaussia crozieri, Owen.*
- *Holocephalus ornatus, Mant.*

**Reptilia**

- *Cetosaurus, 2 species.*
- *Cetiosauria, 2 species.*

**Birds**

- *Platynyx mandelli, Owen.*
- *Nucifraga caryocatactes.*

**Mammalia**

- *Hystricidae, species.*
- *Tetradontidae, species.*

**Amphibia**

- *Homalocephalus, species.*

**Classis Piscium**

- *Arius, one species.*
- *Loboda, one species.*
- *Tetraodon, one species.*
- *Lepidota, 3 species.*
- *Pholidorhynchus ornatus, Ag.*

(Tenant, Stratigraphical List of British Fossils.)

**WEBSTER, THOMAS, F.R.S.** an eminent geologist, was one of the band of scientific men, who, with the late Professor Jameson, the late Leopold von Buch, and Alexander Humboldt, learned the rudiments of mineralogy and geology under the tuition of Werner at Freiberg, where he commenced his studies in 1786. He was long a distinguished and active member of the Geological Society of London, particularly in its earlier days; and was elected a Fellow of the Royal Society on the 9th of March 1786. From 1795 to 1796, and again in 1801, he was concerned, with the gentlemen mentioned below, in the exploration, on account of the government, of the deposits of gold which had been discovered at Crouchall Kinsella, in the county of Wicklow, in Ireland. An account of the discovery was given by John Lloyd, Esq., F.R.S., and a mineralogical account of the gold itself by Arthur Miller, Esq., both relating to Mr. Weaver, was published in the 'Philosophical Transactions' for 1796. A particular history of the proceedings of himself and his colleagues, in reference to the gold workings, was given by Mr. Weaver in his Memoir on the 'Geological Relation of the East of Ireland, inserted in the 'Transactions of the Geological Society,' first series, vol. v. He afterwards com-
no means lucrative. In 1608 he married his first wife, by whom he had two sons and two daughters, of whom only one son, Fletcher Webster, survived him. He is a naval officer of the port of Boston. In May 1513 Daniel Webster took his seat in congress and represented New Hampshire without interruption for nearly fifteen years. Placed by Mr. Clay, the speaker, on the committee of foreign affairs, he made his first speech in the house on the 10th of June, 1613, in moving a series of resolutions on the Berlin and Milan decrees. In 1620 he was appointed to a committee to examine the house, its furniture, library, and manuscripts, which were all destroyed. In August 1614 he was again returned as a representative to congress. From March to December 1615 he was busy engaging in the law firm of Plymouth, when he was transferred to the court of admiralty, to which he removed to Boston, where the causes for trial were of higher importance and the practice was more lucrative.

Mr. Webster retired from congress in 1617. He had purchased an estate of about 200 acres at Marshfield, thirty miles from Boston, and his time during the next six years was partly occupied with law business in Boston and partly with the cultivation of his estate. His favourite amusements were angling in the streams and fishing in the yard, and to private life he was again elected senator as he was also in 1624 and 1626. In 1627 his first wife died. In January 1628 he took his seat in the senate of the United States, having been elected by the legislature of Massachusetts.

He was a candidate for the dignity of president in 1682, but received no votes. In the spring of 1683 he visited Europe for the first and only time in his life, and made a highly tour through England, Scotland, and France. When General Harrison became president in 1681, he was appointed to the office of British army counsel for the states, and in 1682 he was elected chairman of the committee of correspondence. In 1684 he was nominated to the presidency, but was un-electable.

On the death of General Taylor in July 1686, he was re-elected as a member of the court of admiralty, and continued to perform the duties of that high office till his death, which occurred October 24, 1686, at his country residence, Marshfield.

Daniel Webster, as a statesman, an orator, and a lawyer, was one of the greatest men that the United States of America have produced. As a statesman his principles were founded on comprehensive views and a wide range of information, legal, constitutional, and historical, but during his later years he was more a deliberator than an orator. Few men were less disposed to a presiding state than he. He was a decided Federalist. He expressed his belief that if ever the union of the States should be dissolved, the internal peace, the vigorous growth, the prosperity of the States, and the welfare of the inhabitants, would be blissful for ever; and that while the Union endures, all else of trial and calamity which may befall the nation may be remedied or borne. He was undoubtedly the greatest American orator of his day. His power of fixing the attention and producing an overwhelming effect on a deliberative assembly was unequalled. His style was generally argumentative and solid, never deficient of imagery where suitable, but never flowery.

The Works of Daniel Webster,' 6 vols., 8vo, Boston, 1861, consist of his speeches in congress, at the bar, and at public meetings, his correspondence, a few letters, and a Biography by Edward Everett. WELLS.

WEIGHTS AND MEASURES. [Standard, s. 2.]

WEISSE. [Mineralogy, s. 1.]

WELLINGTON, DUKE OF. Arthur Wellesley was born on the 1st of May, 1769, at Degan, Castle, in the county of Meath, Ireland; but in the registry of St. Peter's Church, Dublin, it is recorded that "Arthur, son of the Right Honorable Earl and Countess of Mornington, was born on the 30th of April, 1769." It is probable therefore that he was born in March, at Mornington House, Dublin, the town residence of his parents. After the battle of Waterloo he kept his birthday on the 16th of June, the anniversary of that important victory. He was the third son of the first Earl of Mornington. [Mornington, Eazor.]

The family name was originally Wesley, derived from the Rev. Dr. Samuel Wesley, who was a member of the Wesleyan family. He was a consecrated clergyman and a resident of the village of Wesley, near Northampton.

In 1777, when the name was altered to Wellesley by the first Duke of Wellington, the estate of Wesley was purchased by Sir Henry Wellesley, a grandson of the first Earl. Sir Henry Wellesley was one of the first and most influential members of the family, and was the founder of the celebrated family line. He was the first to adopt the name of Wellesley, and his descendants have continued to bear it ever since.

The first Duke of Wellington was a great soldier, and a statesman of great ability. He was a member of the British parliament, and served in a number of important positions, including Secretary of State for War and the Colonies. He was also a member of the British cabinet, and served as Prime Minister of the United Kingdom for a number of years. He was a great admirer of the British empire, and was a strong supporter of the British navy. He was also a great supporter of the British army, and was a strong advocate of the British military establishment.

The first Duke of Wellington was a great hero of the Napoleonic Wars, and is considered one of the greatest military commanders in history. He was a master of the art of war, and was a great strategist and tactician. He was a great lover of the British army, and was a strong supporter of the British military establishment.

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enter into negotiations, and was evidently trying to gain time, the allied British and native army was ordered to advance into Mysore, which they entered early in March 1799. On the 27th an engagement took place, in which the left wing of the allies, under Colonel Wellesley, routed a body of Tippoo's choice infantry. The army then advanced to Seringapatam, Tippoo's capital, and Colonel Wellesley employed to dislodge the enemy from some strong posts in front of the town, which he executed in gallant style, and with little loss. The fortress of Seringapatam was invested, and the 4th of May the place was stormed by a party under General Baird. After the storming was over, and the confusion began to subside, General Baird desired to be relieved, and Colonel Wellesley ordered him to take up his position on the left of the place. By his exertions and firmness he succeeded in stopping the plunder within the town. Tippoo Saib was slain.

In July 1799 Colonel Wellesley was appointed governor of Seringapatam, then the capital of Mysore. During several years that he held almost vice-regal command in Mysore he was fully occupied in organizing the civil and military administration of the country, and in the execution of this task he improved his natural talents for business, military and civil, and gave an example that quickened the decision of character which have characterized him throughout the whole course of his military career. From the beginning also he paid particular attention to the wants of his soldiers, provided for the supply of provisions, to the management of the hospitals, and to the comfort of the Commissariat and Quartersmaster-General's department, which constitute half the business of an army, and, to use his own words, if neglected, "misfortune and disgrace will be the inevitable consequence." He was always true to his word, and his humanity, and the strict discipline that he maintained among the troops, he acquired the confidence and respect of the native population of Seringapatam.

He was employed in Mysore he was obliged to take the field against one of those revolts that prevale in various parts of India, named Dhondia Waug, who had got together 5000 horsemen, part of Tippoo's dissipated cavalry, and partly from other predatory hands, and who styled himself "King of the Two Worlds." After marching about a month, after having chased of two months, came up with him on the 10th of September 1800, immediately attacked him, and put his army to the rout by a single charge, in resisting which Dhondia himself was slain. In December of the same year Colonel Wellesley was appointed by the governor-general in council to command a body of about 8000 troops asembled at Trincomalee, in the island of Ceylon, for foreign service, and he accyrly proceeded from Mysore to Trincomalee. The expedition was intended either for Batavie or the west end of France. Meantime he set about directing 3000 men to be sent to the Red Sea to act against the French in Upper Egypt, whilst an expedition from Europe, under Sir Ralph Abercorn, was attacking Lower Egypt. The Madras army sent Colonel Wellesley a copy of the despatches from home, and as he knew that his brother, the governor-general, when he ordered the assembling of the force at Trincomalee, had some expectation of its being required for Egypt, Colonel Wellesley, upon his own responsibility, moved at once the whole force to Bombey, where it could be supplied with provisions and other necessary in time to sail to the Red Sea, and where he would be ready to receive final orders from the governor-general. He arrived there about the middle of February 1801, and arrived at Bombey about the middle of March of that year. The governor-general had appointed General Baird to command the Egyptian expedition, leaving to his brother the choice of going under him as second in command, or retaining his own command in Mysore. When Lord Mornington learnt that Colonel Wellesley was at Bombey with the whole Trincomalee force, he could not disapprove of this movement, as he had himself intended to send to the Red Sea a larger body of troops than that which was left at home despatches, but still he thought it ought not to be done without the consent of the commander-in-chief, and required an official explanation of the grounds and motives which had induced his brother thus to act upon his own judgment, without waiting for orders. Colonel Wellesley was not surprised at his brother's remonstrance. General Baird, on 23rd March, 1801 ("Dispatches," vol. 1.) He intended to proceed to the Red Sea, and to have served under General Baird; but on the 26th of March he was seized with fever, and soon afterwards returned to his government in Mysore.

Before leaving Bombay he transmitted to General Baird a memorandum which he had written concerning the operations in the Red Sea, evincing the research and reflection which he had bestowed on his anticipated command.

Colonel Wellesley made an inspection in Mysore of nearly two years. He was raised to the rank of Major-General in April 1802, and in February 1803 he was appointed to command a force intended to march into the Maharrat territory.

On the land war waged between the Mahratta chiefs Holkar and Scindia. The Peishwa, the nominal head of the Mahratta confederation, was looked upon as an instrument in the hands of the strongest. Dowlat Rao Scindia, who ruled the country of Scindia, was a man of great ability and cunning, and artillery, which had been formed by his father, with the assistance of M. de Boigne, a native of Savoy, and was now under the direction of a French officer of the name of Perron. Scindia exercised paramount influence over the Peishwa at Poona. Holkar, another ambitious chief, who had long been at variance with Scindia, suddenly crossed the Nerbudda and marched with a large cavalry force on Poona, which he entered after defeating the combined army of Scindia and the Peishwa. The Peishwa fled to scindia, and Holkar sent a deputation, which Scindia succeeded in subduing, whilst Holkar placed one of his relations on the seat of power at Poona.

The Madras army, under Lieutenant-General Stuart, was ordered to advance into the Mahratta territory for the purpose of making despatches, and Major-General Wellesley was appointed to command a select corps in advance, with which he marched rapidly upon Poona. Having received information on the road that Holkar's army was moving towards the place where he was then encamped, he ordered his cavalry to be put into the field, and, advancing a force of 60 miles in 30 hours, reached Poona on the 20th of April, and thus saved the town. Holkar's people retired without fighting, and in the following month the Peishwa re-entered his capital. Scindia however, being joined by a powerful Mahratta chief, was together in the field making hostile demonstrations against the English and their ally the Nizam, and they were understood to be in correspondence with Puttan, who was joining him in a projected movement against the Mahratta affairs, which was yet more dangerous at a moment when the peace of Amiens the French had just recovered their Indian possessions, the governor-general appointed General Wellesley to the chief command of all the British and allied troops serving in the territories of the Peishwa and the Nizam, with full power to direct all the political affairs of the British government in the same district. (Dispatches,' Fort William, 26th and 27th of June, vol. ii.) The force at his command consisted of about 10,000 troops of all arms, 2000 horse, and 600 guns, and was in the field for 74th Foot. After some fruitless negotiations with Scindia, General Wellesley marched from Poona to the north, and took by escalade the town of Ahmednuggur, which was surrendered to him. He then crossed the river Godavry, and entered Aurungabad on the 28th. The enemy manifested an intention to cross the river to the eastward and steal a march upon Hyderabad, but were prevented by General Wellesley marching along the left flank of the river, and placing himself between them and that city. On the 12th of September the British general was encamped 20 miles north of the Godavry. Colonel Stevenson, with the Nizam's auxiliary force, was at some distance from him. Scindia, who had a large mass of irreducible parties, was no longer able to support the British discipline, and only thought of carrying on a predatory warfare.

About the middle of September, General Wellesley learnt that Scindia had been reinforced by 16 battalions of infantry commanded by French officers, and a large train of artillery, and that the whole of his force was assembled near the banks of the small river Kaina. On the 21st of September General Wellesley had a conference with Colonel Stevenson, on which it was agreed to take the offensive, and to march upon the town of Beed, the capital of the Mahratta country.

The General and the Colonel advanced by two parallel routes round the hills, so as to fall at the same time upon the enemy. General Wellesley on the 33rd received a report that the enemy, after retiring, had crossed the river, and then retired by the morning with their cavalry, and that the infantry were about to follow, but were still in camp at the distance of about six miles. General Wellesley determined to march upon the infantry, and engage it at once. He sent a messenger to
Colonel Stevenson, then about eight miles on his left, to inform him of his intentions, and directing his advance. He moved forward with the 19th Light Dragoons and three regiments of native cavalry to reconnoitre. The infantry, consisting of two British and five native battalions, followed. After a march of about four miles he saw from an elevated plain not only the infantry, but the whole Mahratta force, consisting of infantry, cavalry, and artillery; the right, consisting of the cavalry, was about 10,000 men, and the left, consisting of the infantry, was about 30,000 men, and the rear was still thicker. The British force was entirely unprepared, when the whole Mahratta line retired in disorder, leaving 38 pieces of cannon and all their ammunitions in the hands of the British. The British cavalry pursued the enemy for several miles, taking many elephants, camels, and many baggage; but, after four hours' hard fighting, the British were driven back by the strong force of the enemy, and this exploit concluded the campaign. The Raja of Barar now used for peace, and General Wellesley drew up the conditions of the treaty, by which the Raja ceded to the Company the province of Cuttack with the district of Balsore, and dismissed his European officers. Scindia was glad to follow the example, and on the 30th of December he signed a treaty of peace, by which he ceded to the Company all the country between the Jumna and the Ganges, besides numerous forts. In February 1804, General Wellesley crossed the Ganges to take up his residence in Benares. The young Mahratta princes who had just ascended the throne were fond of universal freedom-party, and, as carrying devastation through the land. The officers of the army of the Deccan presented him with a service of plate of the value of 2000 guineas, with the inscription, "Battle of Assaye, 6th September 1803."

On the 8th of June 1804, General Wellesley broke up the army in the Deccan, in pursuance of orders of the governor-general, and the following month he returned to Seringapatam, where he received from the native inhabitants an affecting address, in which they "implored the God of their fathers to crown all the cares of their constant prayer, whenever greater affairs might call them forth to bestow on him health, glory, and happiness." (Dispatches, vol. iii., p. 493.)

In July 1806, the British army was called to Calcutta to assist in military deliberations. Several important memoirs on the political and military affairs of India, which are given in the third volume of the Dispatches, were written by him about this period. In November of the same year, he left Calcutta for Madras, where he remained till April 1807. In February 1805 he again repaired to Madras, and obtained leave to return to England. About the same time his appointment by the king to be a Knight Companion of the Order of the Bath was published in India, and published in the general orders; and in the following March the thanks of both Houses of Parliament to Major-General Wellesley, for his services, were likewise published in the general orders in India. On the 10th of March 1805 Sir Arthur Wellesley sailed from Madras.

General Sir Arthur Wellesley landed in England in September 1805. In November of the same year he was sent to Hanover in command of a brigade in the expedition under Lord Cathcart, which was intended to make a diversion against the French whilst the army of the Rhine was engaged at Danube against Austria and Russia. The tergiversation of the Prussian cabinet, and the disastrous battle of Austerlitz (December 1805), disconcerted the plans of the allies, and the English returned from Hanover to England in February 1806, without having seen any active service. Sir Arthur Wellesley was now appointed to the command of a brigade of infantry stationed at Hastings. In January 1806, when the news was received of the death of the Marquis of Cornwallis, he was made a Peer of the Empire, and was appointed Governor-General of India. On the 10th of April 1806, he married Lady Catharine Pakenham, third daughter of the Earl of Longford. In that year he was elected member for the borough of Rye, and from his seat in the House of Commons he defended the administration of Lord Hardwicke, which he regarded as "the best of any ministry for the last 25 years." On the 18th of May 1807 Sir Arthur Wellesley was appointed secretary for Ireland, the Duke of Richmond being lord-lieutenant of Ireland, and in that capacity was sworn a member of his Majesty's Privy Council. In August of the same year he was appointed Governor-General of the United Provinces of the North-west of India, and in 1810 of Copenhagen, under Lord Cathcart and Admiral Gambier. On the 30th of August General Wellesley's division attacked the Dutch troops at Koge, carried their entrenched camp, and captured the town of Koge, when they took a large military store and nearly 1300 prisoners. This was the occasion of any importance which took place by land. The bombardment of Copenhagen having induced the Crown Prince of Denmark to listen to terms, General Wellesley was appointed
by Lord Castlereagh, together with Lieutenant-Colonel Murray and Sir Home Popham, captain of the fleet, to draw up the articles of the capitulation, which were agreed to by the Dauphin on the 7th of September, and by which the Danish fleet and naval stores were delivered to the British government till the peace. General Wellesley returned to England with the expedition, and resumed his duties as secretary for Ireland. In the following February (1808) he received in his place in the House of Commons, the thanks of that House for his important share in the success of the expedition, and was appointed commander-in-chief by the legislature, but he was deprived of the assistance of the Danish fleet, upon which he had reckoned in his plans against England.

In the spring of 1808 a military force was assembled at Cork, intended, it was believed, to act against the Spanish colonies of South America, Spain, and through French influence, at war with England. But the invasion of Portugal and Spain by Napoleon, occurring about the same time, gave a new destination to the English expedition. The people of Spain declared against the invaders, and sent to England to ask for assistance. Juntas, or local governments, were formed, and peace was proclaimed between Spain and England. The main strength of the Spanish patriots appeared to be in the north, in the mountainous provinces of Aragon and Catalonia, which were naturalistich to the French, and the deputies who came to England from those provinces requested the employment of an English auxiliary force to effect a diversion by landing on some point of the Spanish coast, and Sir Arthur Wellesley, who had been promoted to the rank of Lieutenant-General, April 25, 1808, was appointed in the following June to the command of the force intended for the Peninsula, consisting of about 9000 infantry and a regiment of light dragoons, with the promise of a reinforcement within a short time. The expedition formed altogether a respectable military force, but the importance of the occasion waranted exertions even greater than these, for the Spanish peninsula had now become the field on which the great question was to be decided. The province of Portugal was to act as a buffer between Spain and Europe, and dictate to all other states, Great Britain included.

Sir Arthur Wellesley landed at Corunna July 20, 1808. The Junta of Galicia asked for nothing but arms and money. They declared an insurrection in case of British auxiliary forces, but they advised General Wellesley to land in Portugal, to rescue that kingdom from the French grasp, and thus to open a ready communication between the north and south of Spain. This was in accordance with Sir Arthur Wellesley's own views, and the general instructions that he had from home. He accordingly sailed on to Oporto, which town had already risen against the French; and there he found the war-like bishop, who was at the head of the insurrection, and had gathered together 5000 men indifferently armed and equipped. He also landed at 6000 men. These French were quartered on the coast, but retired to Lisbon. On the 30th of July, he anchored in Mondego Bay, which he fixed upon for the landing of the expedition. The landing took place on the 1st of August, near the small town of Figuerias, on the south bank of the Mondego. The number of troops landed was about 9000. On the 8th Major-General Spencer joined him from Cádis with about 4000 more.

The French force in Portugal at the time, under Junot, consisted of 15,000 men, in winter quarters, conducting the garrisons of Almeida, Elvas, Peniche, Setubal, and other places, there remained about 14,000 men for the defence of Lisbon. Their communications were cut off from their countrymen in Spain, for, since the surrender of General Dupont, the Spanish patriots were masters of Andalucia and Estremadura, and in Old Castile the French troops under Bes-teres had not advanced westward further than Benavente, being observed by the Spanish army of Galicia. Although the French were now in the middle of winter, they retired to the Ebro. A clear stage therefore was left for the contest in Portugal between Wellesley and Junot, whose respective disposable forces were nearly equal, the French however having the advantage of a considerable body of cavalry in support of their line of communications.

On the 9th of August the English began their march southward. The advanced guard entered the town of Leiria on the 10th, where it found the Portuguese force of 6000 men under General Freire, who, having appropriated to the wants of his men the stores which, by an agreement between the junta of Oporto and Sir Arthur Wellesley, were intended for the English, further demanded that his corps should henceforth be furnished with provisions by the English commissioner. Sir Arthur Wellesley, however, informed General Freire that his corps was by resolution of the junta of Oporto, and Wellesley declined to comply. Freire then refused to advance with the English, but remained behind at Leiria, and was with difficulty prevailed upon to allow about 1000 of his men to join Sir Arthur. On the 14th the English, under the command of Sir John Caldas, following the road to Torres Vedras, which runs parallel to the sea-coast. It was near Rolica, about ten miles beyond Caldas, that the first engagement took place.

When the Spanish had risen against the invaders, the spirit of resistance spread to Portugal, the natives of which country had equal motives for being dissatisfied with the French rule. The French had with their army several Spanish regiments, which were scattered about the country in the several garrisons. The Spanish troops which were at Oporto, forming the principal part of that garrison, hearing of the news from Spain, revolted against the French commandant. The English commander then sent for a few French soldiers that he had with him, and set off with their prisoners for Spain, leaving the Portuguese at liberty to act as they pleased. A junta was then formed, with the bishop at their head, and the whole of the provinces north of the Donro rose against the French. The insurrection spread southward into Beira. In the south the people of Algarve rose, and those of Alemtejo followed their example, being supported by a body of Portuguese, which, at the time of the engagement, were on their way to join the insurrection in that quarter.

The French General Loison, who had been sent to repress the insurgents in the north, was quickly recalled by Junot and sent into Alemtejo. He entered Évora after a desperate action, in which the town was given up to indiscriminate massacre. General Margarow executed like vengeance at Leiria, sparing neither age nor sex. Similar scenes took place at Guarda in the north, and at Beja and Villevolges in the south. In the town of however from Parno, the English also losing their own men daily, for the peasants were always hovering about their line of march, ready to cut off stragglers and intercept the communications. The whole kingdom," observed Sir Arthur Wellesley in one of his first despatches after landing in Mondego Bay, "in the exclusion of the neighbourhood of Lisboa, is in a state of insurrection against the French. Their means of resistance are however less powerful than those of the Spaniards. The Portuguese troops were been reduced to 1200 men, of whom 500 are stationed off to Brazil, and their arsenals are pillaged or in the power of the enemy. Their revolt, under the circumstances in which it has take place, is still more extraordinary than that of the Spanish nation. They have lost the cases of the nation, and the strength of the position of the French near Lisbon. On the 30th of July, he anchored in Mondego Bay, which he fixed upon for the landing of the expedition. The landing took place on the 1st of August, near the small town of Figuerias, on the south bank of the Mondego. The number of troops landed was about 9000. On the 8th Major-General Spencer joined him from Cádis with about 4000 more.

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Manny's right, and thus watch the approach of Loison; and be centre, which was the column of attack, to march along
valley to the front of Laborde's position. The French, after a gallant defence, were obliged to retire, which they did in good order, being protected by their cavalry. They withdrew to Torres Vedras, where they were joined by Loison's corps. The loss of the French in the engage-
ment was estimated at about 600 killed and wounded, besides three pieces of cannon; that of the British was 450. It must be observed here, once for all, that the
offensive of the French throughout the war were never accu-
ately known, as they published no returns, whilst the British
made weekly returns. The commanders and the respective officers in command of regiments after a battle, were always published in the 'Gazette.'

On the 10th of August General Wellesley advanced to Estremoz, keeping along the coast-road leading to it. In the 10th he moved to Vimiero, where he was joined next day by Generals Anstruther and Auckland, with two brigades just arrived on the coast from England, and which raised his force to about 17,000 British, besides 1600 Portuguese. At the same time, General Wellesley was superseded in the chief command by Lieutenant-General Sir Harry Burrard, who arrived from England. The govern-
ment at home had determined, in consequence of the prop-
lions appearing of affairs in the Peninsula, to have there an army on the spot, and a force offered to the French and
ordered the corps of Lieutenant-General Sir John Moore, which had just returned from a fruitless expedition to the Baltic, to proceed to Portugal; and they gave the chief command of the army to Lieutenant-General Sir Hew Dalrymple, governor of Lisbon, Sir John Moore, respectively, was restored to the chief command; and Lieutenant-Generals Sir John Moore, Sir Arthur Wellesley, the Hon. John Hope, Lord Paget, and MacKenzie Fraser, to command respectively divisions of the army.

Sir Harry Burrard arrived in a frigate in (Maceia Bay, near Vimiero, on the evening of the 20th, and General Wellesley immediately went on board, and reported to him his situation of the army, and his own intended plan of action. He did not believe the enemy was at Mafra, and thus turn the strong position which De Laborde and Loison had taken at Torres Vedras. By this mea-
sure he would oblige the French either to give battle or retreat to Lisbon under great disadvantages. Sir Harry Burrard how-
ever decided not to advance, nor, under the threat of the
reinforcements under Sir John Moore. But the enemy in the meantime was bringing the question to a speedy
issue.

Next, having joined De Laborde and Loison at Torres Vedras with all his force, estimated at about 14,000 men, of whom 1600 were cavalry, attacked the English in the position at Vimiero early in the morning of the 21st of August. The principal attack was made upon the British centre and left, with the intention of having him surrouned, and this was done, of times, of driving the English into the sea, which was closed in their rear. The attack was made with great bravery and steadiness, but was as gallantly repulsed by the British; it was repeated by General Kellerman at the head of the French reserve, which was also repulsed; and the French, being charged by the bayonets, withdrew on all points in confusion, leaving many prisoners, among them a general officer, and 14 cannon, with ammunition, &c., in the hands of the British. The loss of the French in killed and wounded was estimated at about 900, of which 200 was British. It was 730. Sir Harry Burrard landed, and was present in the field during part of the engagement, but he declined assuming the command, or in any way interfering with General Wellesley's dispositions, till the enemy was repulsed. Towards the close of the action, when the French were seen retiring in confusion, General Wellesley wished to follow up his victory; General Ferguson on the left was actually close upon the retreating enemy, and if General Hill and the advanced guard had not had a desperate struggle, they would have reached it before the French, who would have been cut off from Lisbon, and perhaps obliged to lay down their arms. Such was Sir Arthur's view; but Sir Harry would not move any farther, especially on account of the superiority of the French cavalry. General Ferguson was ordered to desist from pur-
suit, and the French officers were thus enabled to rally their men, and make good their retreat to Torres Vedras.

On the 30th of August Sir Hew Dalrymple, the com-
mander-in-chief, landed in Maceia Bay, and assumed the command. In the course of the day General Kellerman was advanced with a flag of truce on the part of Junot to propose an armistice, preparatory to entering into negotiation for the evacuation of Portugal by the French. The terms were discussed between General Kellerman and Sir Hew Dal-
rymple, who in the end directed General Wellesley to sign the armistice. Among the articles there were various by which it was judged the terms of the final convention by stipulating that the French army should not "in any case" be considered as prisoners of war, and that all the individuals composing it should be carried to France with arms and baggage, and that of every officer and soldier, nothing should be withheld." This, of course, would include the church plate and other public and private property which the French had taken either at Lisbon or in the various towns which they had sacked in consequence of the
invasion, to which they had been admitted. General Wellesley did not "entirely approve of the manner in which the instrument was worded;" but the articles being laid before the commander-in-chief, were signed by him that evening. The armistice however was made subject to the approbation of the Admiral, Sir Charles Cotton; and as one article of it stipulated that the Russian fleet in the Tagus, under Admiral Sinivain, should enjoy all the advantages of a neutral port, Sir Charles objected to this, and the convention was therefore suspended. In the evening Russian admiral. On the 25th Sir Hew Dalrymple signified to Junot that the armistice would be at an end on the 28th at noon, unless a convention for the evacuation of Portugal by the French should be agreed upon before that day. In the mean time, Sir Hew Dalrymple made his head-quarters at Vimiero to Renalhal, near Torres Vedras, within the boundaries stipulated by the armistice. Sir John Moore had also arrived in Maceia Bay, and his troops were about being landed. It is important, in considering the necessity of coming to terms, commissioned General Kellerman, who forwarded, Colonel Murray, quarrermaster-general to the British army, about the final convention. The favourable moment for pushing upon the French was now past; and if they were to come over in force, they might either defend themselves within Lisbon, or cross the Tagus to Elvas, which, being a place regularly fortified, would have required a long siege, during which the British army could not have been made available in Spain. (Inquisit. iv., p. 130.) General Wellesley, on the 27th, Sir Hew Dalrymple a memorandum for Colonel Murray, suggesting, among other things, a separate agreement with the Russian admiral, and the propriety of devising some scheme which should give up the church plate which they had seized. On the 30th the convention for the evacuation of
convention was brought to the British head-quarters at Torres Vedras, and, being laid before a meeting of general officers, several alterations were made, and the form so altered was presented to Junot at last moment, with the concurrence of General Wellington, with the omission of several of the alterations, and was ratified by Sir Hew Dalrymple on the 31st. Sir Arthur Wellesley was not present at the final ratification, being at Sobral with his division. This document has become known by the name of the Convention of Cintra, though it was arranged at Lisbon, and finally ratified at Torres Vedras. The article which gave most offence was that by which the French, under the name of baggage, were allowed to carry off much of the plunder of Portugal. Some limits however were put to this by a clause corresponding with General Bercourt at the head, to superintend the strict execution of the terms of the convention. Through the exertions of the commissioners the spoils of the Museum and the Royal Library were restored, together with the money taken from the public treasury. With regard to the Russian fleet, it was agreed that the ships should be held as a pledge by Great Britain during the war, and that the crews should be conveyed home in British ships.

The French evacuation took place in the month of September, and the British troops took possession of the forts of Lisbon in the name of the Prince Regent of Portugal. The whole country being now free from the enemy, a council of regency was appointed, of which the active Bishop of Oporto was a member. The junta of the Portuguese in general was manifested in the most unequivocal manner. But in England the terms of the convention were the subject of severe and loud censure, and the government appointed a board of in-
quiry to examine into the matter. Sir Hew Dalrymple and
Sir Harry Burrard were recalled in order to be examined by the Board, as well as Sir Arthur Wellesley, who had already asked and obtained leave to return to England. The court sat in the month of November, and, after a long examination, reported that, the Convention of Chiutra having been productive of great advantages to Portugal, to the army and navy, and to the general service, the court was of opinion that no further proceeding was necessarily necessary on the subject, "because, however some of us may differ in our sentiments respecting the fitness of the convention in the relative situation of the two armies, it is our unanimous declaration that unquestionable zeal and firmness appear thoroughly possessed by them." The General Board of General Sir Hew Dalrymple, Sir Harry Burrard, and Sir Arthur Wellesley, as well as that the ardour and gallantry of the rest of the officers and soldiers on every occasion during this expedition have done honour to the troops and reflected lustre on your Majesty's arm." The king adopted the opinion of the board.

Sir Arthur Wellesley's employment in the Peninsula being now terminated, he resumed the duties of his office as Chief Secretary for Ireland, whither he proceeded in the month of December. Parliament having re-assembled in January 1809, he returned to London to resume his seat in the House of Commons. On the 27th of January he received, through the Speaker, the thanks of the House for his distingushed conduct in the province of Galicia, and the House of Lords passed resolutions to the same effect, which were communicated to Sir Arthur by the Lord Chancellor.

Campaign of 1809.—Napoleon, with an army of more than 25,000 men, having burst through the lines in line and routed the troops, forced in person the strong pass of the Somosierra on the 30th of November 1808, and four days afterwards was in possession of Madrid. Meantime, Buonaparte, with an overwhelming force, had been sent against Sir John Moore, who had advanced into Spain as far as Salamanca. This movement was followed by the disastrous retreat of the small army under Sir John Moore, the battle of Corunna, January 16, 1809, in which the heroic commander was slain, and the disbanding of the British forces for England. The French, following up their success, spread over Leon and Estremadura to the borders of Portugal, and Soult, having overrun Galicia, marched into the northern Portuguese provinces, and carried Oporto by storm against the native troops. The small British force which had been left in Portugal when Sir John Moore advanced into Spain was concentrated by General Sir John Cradock for the defence of Lisbon. The unfavourable turn of affairs in Spain induced the British government to make another effort to assist Sir John Moore, and to send reinforcements to the Spaniards in their momentous struggle. Sir Arthur Wellesley, having previously resigned his office of Secretary for Ireland as well as his seat in parliament, was sent to Portugal to assume the chief command of the British forces in the Peninsula; and arrived there, having left his staff with his staff. He was followed by reinforcements of infantry and several regiments of cavalry. These, together with the Portuguese regulars under General Beresford, who the Prince Regent had appointed to the chief command of his army, enabled him to bring into the field a force of about 25,000 men, with which he marched at the end of April to dislodge Soult from Oporto, leaving a division under General Mackenzie on the Tagus to guard the eastern frontier. At the same time, the French force of General Victor was stationed near Merida, in Spanish Estremadura. The army under General Wellesley, having assembled at Coimbra, moved on the 9th of May in the direction of Oporto, and drove back the French troops, which had advanced south of the Douro. On the 11th of May by night, and supplied the southern bank of that river opposite the city of Oporto. The French had destroyed the bridges and removed the boats to their own side, and Soult was preparing to retire to Galicia.

General Wellesley sent a brigade under General Murray to pass the river about four miles above Oporto, whilst the bridge of Gares was directed to cross the river at the suburb of Villavermude, and the main body under the commander-in-chief passed over the Douro in about five Portuguese boats that they could find. The Douro at that spot is very rapid, and nearly three hundred yards wide. About ten o'clock in the morning of the 15th of May, two hosts having been discovered, General Fretaz with three companies of the Buffs crossed the river, and got possession of an unfinished building on the Oporto side, called the Seminaria. The French in Oporto were taken by surprise and, alarmed, and marched out to oppose the Seminaria, but, before they could dislodge the first party that had landed, General Hill crossed with fresh troops, and, pursued by the British artillery from the southern bank, and the Galicia, and driven back General Sherbrooke with the Guards crossed lower down into the very town of Oporto, amidst the acclamations of the inhabitants, and charged the French through the streets. Meanwhile the head of Murray's column, which had crossed at the time when the French first showed their retreat, which was effected in the greatest confusion. He left behind his sick and wounded and many prisoners, besides artillery and ammunition, and retired by Amarante with the view of passing into Spain through Trueba-Montes; but finding that Lobain had to hold the possession of Amarante, which was taken possession of by the Portuguese, he marched by Guimarães, Braga, Salamanca, and Montalegre, into Galicia. In this disastrous retreat the French were obliged to destroy in Januari of the artillery and part of their baggage, and the road was strewed with dead horses and mules, and French soldiers, many of whom were put to death by the passers-by before the advanced guard of the British could save them.

Sir Arthur Wellesley pursued the French as far as Montalegre, and, having driven them out of Portugal, retraced his steps to the south. The passage of the bridge and the capture of Almeida and Bragança were regarded as the most favourable circumstances. The English lost in the attack of Oporto only 23 killed and 69 wounded.

On taking possession of Oporto, General Wellesley issued a proclamation, stating that the inhabitants to respect the French wounded and prisoners, and he wrote to Marshal Soult to request him to send some French medical officers to take care of their sick and wounded, as he did not wish to treat them as prisoners.

The mention that Sir Arthur Wellesley was now turned towards Spain. It was necessary to strike a blow in the country, and the present occasion appeared favourable. The condition of the national cause of Spain had improved since Napoleon had left her; for the general had individually the same means that he had at his disposal, and there was not a sufficient bond of war amongst them all to make them act in concert. Each had a separate command over a large division of the country, and each had his separate interest. Soult, under the orders of Napoleon, who had been established in Madrid as king of Spain, had little or no control over them, and had not himself sufficient military skill to direct their movements. Each marshal, therefore, and there were five or six in all, had his own command, his own policy, his own plans, his own tactics and his own discipline. Marshal Victor, Duke of Bellena, commanded the first corps in Estremadura, near the borders of Portugal, having about 35,000 men, of whom however only 20,000 were under arms. General Sebastián commanded the fourth corps in La Mancha, which mustered about 20,000 men under arms. A division of reserve under Desoles stationed at Madrid, together with King Joseph's guards, amounted to about 15,000 men. Keilermann's army near Bollena, with some of the Spanish forces of Leon and Asturias, comprised about 10,000 more. All the above troops, amounting to about 60,000 disposable men, were considered to be immediately under King Joseph in the protection of Madrid and of Central Spain, and also under the orders of Marshal Victor. The corps of Soult and Tages and the Guadarrama. Soult had a distinct command. He had mainly to occupy the northern provinces of Spain and to act through them against Portugal. He had in front of him about 20,000 men under arms; the fifth, or Mortier's corps, amounting to 16,000; and Ney, with the sixth corps about 15,000. Soult's force in all was about 58,000 men on the field. These were the two French armies with which Soult had to contend, and in which he was likely to fall into collision. Besides these there were in Eastern Spain the third and seventh corps, making together about 50,000 men, under Buchs and Augereau, who were pretty much employed in Aragon and Catalonia; and 35,000 men var
the Puertó de Baños, upon Piasencía, in the rear of the British. General Wellesley had charged de Cuesta to guard the
mountain-pass to La Raschana. He had also sent only 600 men thither, a force which of course proved insufficient to arrest Soulí's march. General Wellesley did not know that Ney had unexpectedly evacuated Galicia, and was also advancing from Asturias upon the British left. Mortier also, with his cavalry corps, was moving forward; so that there were more than 60,000 fighting men of the enemy behind the mountains of Piasencía, ready to act on the left flank and rear of the British, who had besides 60,000 more in front of their headquarters. The British force in the field did not exceed 40,000. There were still 6000 of Soulí's men on their march from Lisbon to join the army, but they did not arrive till after the battle. The Spanish army of Cuesta mustered about 24,000 men, such as they were. The Portuguese regiments, under Besseres, had rendezvous to guard the north-east frontier of Portugal, towards Almeida. It had been previously agreed between General Wellesley, Cuesta, and the Spanish Supreme Junta, or Central Government, that General Venegas, who was at the head of the Spanish army of Andalucia, consisting of about 25,000 men, should march through La Mancha upon Madrid, while Wellesley and Cuesta were advancing by the valley of the Tagus. Venegas did advance through La Mancha, but it seems that he received no communication from the Junta whilst the effect of slackening his march; he however made his appearance at last towards Aranjuez and Toledo, and it was his approach on that side which induced King Joseph to engage Wellesley and Cuesta, in order to save Madrid from the hands of the Allies. When the French army had been dispersed over a great extent of territory, and Soulí's arrival at Piasencía would have obliged the English to retire precipitately. But King Joseph fearing that Venegas from the south, and Sir Robert Wilson, who, with the Lusitanian Legion, was hovering in the neighbourhood of the Allies, was marching with 20,000 men towards Talavera, Cuesta fell back with him upon the position of Talavera, where there was good ground for defence. He placed the Spanish army on the right near the Tagus, the town of Talavera, its front protected by redoubts, ditches, mud walls, and felled trees. In this position they could hardly be seriously attacked. The British infantry on whom the general could depend, occupied the left of the line, which was open in front, but its extreme left rested upon a steep hill, which was the key of the whole position. The whole line extended in length about two miles.

On the 27th of July the French moved from St. Olla, crossed the river Alberche, and drove in the British outposts, and knocked two of their brigades on the head, to back steadily across the plain into their assigned position in the line. Victor now attacked the British left, whilst the 4th corps made a demonstration against the Spaniards on the right, several thousands of whom, after discharging their pieces, fled panic-struck to the rear, followed by their artillery, and creating the greatest confusion among the baggage retainers and mules, &c. and it was with difficulty that Generals Wellesley and Cuesta prevented the rest of the Spanish troops from following the example. Luckily the position of the Spanish army was strong in front, and the French, not knowing exactly what was going on, made no further attack on that side; their efforts were directed against the British left, which they succeeded for a moment in turning, and they gained the summit of the hill; but General Hill, being ordered to that point with more troops, drove the French down after an obstinate struggle which lasted till after dark, and in which the French lost about 1000 men and the British 800. Next morning, the 28th, the French renewed the attack, which was again repulsed after losing about 1500 men. After a pause of some hours the attack was renewed upon the whole British front. Heavy columns of French infantry of Sebastian's corps entered the British right under General Campbell, which joined the Spanish army, and was joined in turn by the British division on the right. The general staff of the enemy, who were near the hill, and expected the British cavalry battle, found it too late to join in the action. The British cavalry, in the mean time a French division on the right of the British army, had got possession of the hill, and the British troops were then ordered to advance, and they speedily overran the enemy's line of battle, and drove them from the field. The British army, after a battle in which more than 12,000 French and 8000 British were killed or wounded, advanced to the hill of Alcaraz. The British victory was complete; the army under Wellington was in possession of all the passes from Spain into Portugal, and the French army was in possession of the passes from Portugal into Spain.
left, and here a cavalry fight occurred in which the 23rd Li.4ht Dragoons lost one-half of their number. General Wellesley had taken the precaution of posting the Spanish division of the right rear of the line, and the right of both armies, and the sight of these effectually precluded any further advance of the French on that side. The principal attack of the French was against the British centre, with which was joined the right wing of the Spanish army. The French columns came quite close up to the British line, but they were received with a discharge of musketry which made them reek back in disorder. The Guards then charged them, and in the course of the moment the enemy were carried too far, upon which the General immediately ordered a general retreat, retreating in good order and dragging back all the French who had advanced, and those who had been repulsed rallied and faced again. While the French batteries poured their shot upon the flank of the Guards, who in their turn drew back in some disorder; at the same time the German Legion, which was on the left of the French, got into confusion, and the British centre was thus broken. This was the critical moment of the battle. General Wellesley, who, from the hill on the left of the position, had a clear view of the whole field, seeing the charge of the Guards, and expecting the issue of it, immediately ordered the 48th regiment, under Colonel Donellan, which was posted on the hill on the left, to advance in support of the centre, and at the same time directed General Cotton's light cavalry to move up to the hill, which, he supposed, would be occupied by the retreating French, and wheeling back by companies let them pass through the inter vals; then, resuming its line, the 48th marched against the right of the pursuing columns, plated them, and this double charge of the French themselves charged upon them with a fire and regularity, checked their forward movement. The Guadarrama and Germans quickly rallied, and the brigade of light cavalry coming up the rear at a trot, the French began to waver, and at last gave way and retired in their original position, their retreat being protected by their light troops and artillery. The British reduced to less than 14,000 men, and exhausted by fatigue, were unable to pursue them; and the Spanish army, which had been accorded engaged, was incapable of making any evolutions; and when the evening was advanced, the British, having this day's battle, thus could not be engaged, nor was it possible that it had occupied in the morning. The French were repulsed at all points, and lost two generals and 480 officers, and about 600 wounded, besides the loss of 17 guns. On the side of the British, two generals and 800 men were killed, and three generals and about 4000 men wounded.

The next morning, July 30th, at daybreak, the French army made a new movement; it was to the Alberche, and this movement was anticipated and followed up by General Robert Craufurd, which the English camp from Lisbon and the 43rd, 52nd, and 95th. This was the light brigades, which at returns acquired a military celebrity for its lightness of its movements.

Sir Arthur Wellesley sent on the 29th and 30th in establishing his hospitals in the town of Talavera, and endeavored to get provisions, as his men were nearly starved. In this he was not at all assisted by the Spanish authorities or the Spanish inhabitants. "We are miserably supplied with provisions—" he wrote to Lord Castlereagh on the 1st of August from Talavera: "the Spanish armies are now so numerous that they eat up the whole country. They have no magazins, nor have we, nor can we collect any, and there is a scramble for everything. I think the battle of the 28th is likely to be of great use to the Spaniards; but I do not think them in a state of discipline to contend with the French." (Dispatches, iv, p. 554.)

King Joseph, with the 4th corps and the reserve, moved on the 1st of August farther back to Illescas, on the road between Madrid and Toledo, in order to oppose the army of Andalusia under Venegas; and Victor, who had remained on the Alberche with the 1st corps, retreated likewise on the road to Madrid, from the 3rd of July to the 4th of August, when the British army reached the town of Cuesta.

Sir Robert Wilson on his flank. Sulf was now advancing from the north with less than three corps, one of which, commanded by Mortier, entered Plasencia on the 31st, having passed, without opposition. The other was the reserve division, the defile of Elnos, which Cuesta had promised to give up to. The 2nd corps, entered Plasencia on the 1st of August, whilst NAY was moving on from Salamanca in the same direction. They found Plasencia deserted by most of the inhabitants, and no intelligence of the position of the British and Spanish armies, except vague rumors of a battle having been fought a few days before. On the 2nd of August Sir Arthur Wellesley learnt that the enemy had entered Plasencia. Supposing a retreat to Plasencia, he thought it possible to secure only 15,000 men, and that his intention was to join Victor, he determined to go on to him before he could effect the junction: he therefore marched on the 3rd of August to Oropesa with the British army, leaving General Blanford, with the Portuguese cavalry, to protect the hospitals; and in case he should be obliged by any advance of Victor to leave Talavera, to collect carts to move away the wounded. The position of the hostile armies was now very singular: they were all crowded along the road between Madrid and Toledo, with the British army on the right, facing the French army, and on the left, facing the Portuguese troops. Porta Josep and Sebastiani were at Illescas and Valdemoro, between Madrid and the Tagus, while the advanced posts of the French were at or opposite the town of Toledo. Victor was lower down on the right bank, at Maqueda, near the Alberche, watching Cuesta, who was at Talavera. General Wellesley was farther down, at Oropesa. Soult was on the Tietar, on the road from Plasencia to Almazara. Beneford, with the Portuguese, was said to be moving farther west along the frontiers of Portugal. "The allies under Wellesley and Cuesta hold the centre, being only one day's march assunder; but their force, when concentrated, was no more than 47,000 men. The French army stood on the Tagus, with which was joined the right wing of the Spanish army, and the right of both armies, and the sight of these effectually precluded any further advance of the French on that side. The principal attack of the French was against the British centre, with which was joined the right wing of the Spanish army. The French columns came quite close up to the British line, but they were received with a discharge of musketry which made them reek back in disorder. The Guards then charged them, and in the course of the moment the enemy were carried too far, upon which the General immediately ordered a general retreat, retreating in good order and dragging back all the French who had advanced, and those who had been repulsed rallied and faced again. While the French batteries poured their shot upon the flank of the Guards, who in their turn drew back in some disorder; at the same time the German Legion, which was on the left of the French, got into confusion, and the British centre was thus broken. This was the critical moment of the battle. General Wellesley, who, from the hill on the left of the position, had a clear view of the whole field, seeing the charge of the Guards, and expecting the issue of it, immediately ordered the 48th regiment, under Colonel Donellan, which was posted on the hill on the left, to advance in support of the centre, and at the same time directed General Cotton's light cavalry to move up to the hill, which, he supposed, would be occupied by the retreating French, and wheeling back by companies let them pass through the intervals; then, resuming its line, the 48th marched against the right of the pursuing columns, plated them, and this double charge of the French themselves charged upon them with a fire and regularity, checked their forward movement. The Guadarrama and Germans quickly rallied, and the brigade of light cavalry coming up the rear at a trot, the French began to waver, and at last gave way and retired in their original position, their retreat being protected by their light troops and artillery. The British reduced to less than 14,000 men, and exhausted by fatigue, were unable to pursue them; and the Spanish army, which had been accorded engaged, was incapable of making any evolutions; and when the evening was advanced, the British, having this day's battle, thus could not be engaged, nor was it possible that it had occupied in the morning. The French were repulsed at all points, and lost two generals and 480 officers, and about 600 wounded, besides the loss of 17 guns. On the side of the British, two generals and 800 men were killed, and three generals and about 4000 men wounded.

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Sir Arthur Wellesley now moved his head-quarters to Deluytse, and afterwards to Janice, on the high road to Portugal, effecting a strong rear-guard to protect the south bank of the Tagus, and prevent the enemy from passing the river. The bridge of Almaraz had already been broken by the Spaniards. Custa, following the British movement, passed to the south of the Tagus by the bridge of Azunobe, followed by the French, who dispersed his force, and crossed the river on the 8th with a numerous cavalry, overpowered the Spanish rear-guard, and seized the g Tunes. General Wellesley however caused the remainder of the Spanish artillery to be dragged up the mountains of Meta d'Obor, a strong position, and to be placed on the heights of Mirabete, forming the bridge of Almaraz. The line of defence of the Allies was thus re-established. Meanwhile King Joseph recalled Mortier's corps, which had crossed the Tagus at Tamega, and was ordered to join Sebtióan against Venegas, who had in advance advanced to Almodovar, near Toledo. Marshal Ney, on the other side, whom Soult had directed to fort the Tagus below Almaraz, could not dis-cover the ford. Soult now proposed to march with his three corps by Conia and Almabuen, and reach Lisbon, by the right bank of the Tagus, before the English; but Ney, Jouard, and King Joseph opposed the plan, and soon afterwards a despatch came from Nap-oleon, dated after the battle of W.tarn, from the Austrian emperor's palace at Schönbrunn, forbidding further operations against the British, and intimating that the termination of the Austrian war placed at his disposal should reach Spain.

The Emperor Napoleon now, to crush his enemies, trusted chiefly to his overwhelming masses, which, though recruited much from the Spanish cavalry in his armies in Spain was beyond all precedent. Napoleon was resolved to play a sure game. He had already drawn 620,000 men to Spain, and yet he did not think them enough. His numbers were too great, massed on one side, the smallest of which, that will succeed, I thus wrote to King Joseph before the battle of Talavera. It is worthy of remark that Sir Arthur Wellesley, writing about the same time, said, I conceive that the French have never fought a battle of so large a proportion of numbers. Soult's army now went into cantonments in Estremea de Leon, near the borders of Portugal. Sebastiani having defeated Venegas at Almonacid, drove him back upon the Sierra Morena. King Joseph was again residing quietly at Madrid.

In England, on the receipt of the news of the battle of Talavera, Sir Arthur Wellesley was raised to the peerage by the titles of Baron Douro and Viscount Wellington. Some few days afterwards, he left his head-quarters at Badajoz, and placed his army in cantonments on the line of the Guadiana. His chief motive was the neglect of the Spanish armies in supplying his army with provisions, which obliged him to draw near his magistrates in Portugal, where, in consequence of his repute, he was kept in constant op-rating with the disinterested Spanish armies. Lord Wellington had contrived, notwithstanding Custa's neglect, to carry away 20,000 sick and wounded from Talavera; the remaining 16,000, whom he was obliged to leave there, recommended earnestly to the French generals, Mortier and Kellerman, and his expectations were not deceived. Marshal Mortier in particular showed the utmost kindness to the British wounded, and would have attended to before his own men.

In October Lord Wellington repaired to Lisbon, and proceeded to reconnoitring the whole country in front of that capital, for it was then that he resolved upon the construction of the celebrated lines of Torres Vedras, which enabled him to battle all the efforts of the French in the following year. We can only refer the reader to the 'Memorandum' he wrote at Lisbon on the 20th of October for Lieutenant-Colonel Fletcher, of the Engineers, in which he clearly points out the double line of position, the inevitable and redoubtable, the number of men required at each post, &c., as if the whole were already in existence before his eyes. This paper, so remarkable considering the epoch and circumstances in which it was written, is a most striking evidence of Wellington’s foresight. In the following year, the capture of Badajoz, owing to the great number of troops of the French, the barbarous conduct of the British authorities, the numbers of men required for each post, &c., the conclusion is a striking one. The plan of his course had never been said or even whispered at the time. He returned to his head-quarters at Badajoz, whence he made an expedition to Seville, where he conferred with his brother the Marquis Wellesley, who was then the British ambassador in Spain, and whom he accompanied to Cadiz. On the 11th of November he returned to his head-quarters at Badajoz. At the same time another fatal blow was committed by the enemy. On the 25th of November, Supre- me Junta ordered the army of Andalusia, joined by the French army of Estremadura, to advance suddenly upon Madrid, and this without any previous communication with the viceroy. Dugout Wellington, who was at Badajoz, or, with the Duke of Parque and the army of Estremadura, was in communication continually with his chief. Venegas, the general of the army of Andalusia, had been the favorite of the Junta, and the officer who was in his favor. It is now retired, and made to command the army of Estremadura. These two armies, each composed of the principal regular forces of the Spanish, and which, posted within the line of the Tagus and along the range of the Sierra Morena, protected, and might long have protected, the south of Spain, were drawn away upon a foolish attempt. Arriea, with nearly 50,000 men and 60 pieces of artillery, advanced into the plains of Mancha, and was attacked on the 18th of November, in the open fields of Ocaña, by the two French corps of Mortier and Sebastian; and, although his men fought with sufficient courage, yet he was completely routed, with the loss of more than one half of his army, and all his baggage and artillery, with the exception of 15 guns. About the same time the Duke of Parque, with a part of his army, was repelled from the city of Salamanca by the French army. Wellington had directed his army to be reviewed on the Tagus, or, as the French called it, the wall which had previously been so completely lost by the ignorance, precaution, and mismanagement of those whose direction it was in charge of. I have mentioned, however, that they were to preserve their arms, or even one of them, the empire. The French could have sent no reinforcements which could have been of any use; time would have been gained; the state of affairs would have improved daily; all the advantages in the field could have been turned to account by any diversion on the continent, or by the growing discontent of the French themselves with the war, the French army must have been driven out of Spain. But nothing will answer except to fight great battles in plains, in which the defeat of the Spanish army is certain as the commencement of the battle. They will not credit the accounts I have repeatedly given them of the superior numbers of the French; they will seek them out, and find them in strength.

Lord Wellington now directed towards the north-east, for he foresaw that the storm would burst upon Portugal from that quarter. He accordingly retired from Spanish ground altogether into Portugal, and moving through Alentejo with the mass of his army in December, crossed the Tagus at Abrantes; and thence marching to the Mondego, fixed his head-quarters at Vise in January 1810, having his outpost along the frontiers of Spain towards Ciudad Rodrigo. He left General Hill’s division south of the Tagus to protect Alentejo. In the mean time, Spain and Beesford were indefatigable in their endeavours to raise the Portuguese regular army to a state of efficiency in numbers, armament, and discipline.

Campaign of 1810.—By his campaigns of 1809 General Wellington had delivered Portugal from the French. In the campaign of the early part of 1809 he had again repelled a fresh invasion of the northern part of that kingdom. The subsequent Spanish campaign of the same year, which was undertaken with a view of striking the French army away from Castile and recovering Madrid, failed through want of good management on the part of the Spanish generals, and of discipline in the Spanish armies. The battle of Talavera, the first fought by Wellington on Spanish soil, was so confused, and produced such a result, and the British general was obliged to evacuate Spain. Fresh blunders on the part of the Spaniards led to the con- qiiest of Andalusia by the French. The war in Spain then assumed the character of a partisan warfare, and Wellington saw that it would be in vain for the present to expect that
Spain could make any adequate effort to shake off the French yoke. Portugal, however, was free, and Wellington thought that she might be preserved by means of a British force of 80,000 men, assisted by an effective Portuguese army. As in addition to the militia, even supposing the French should obtain possession of the remainder of the Peninsula. This he stated, in a letter to Lord Castlereagh, written from Mudela, 25th of August, 1809, soon after his retreat from Talavera. His determination being founded upon facts, of the utter inability of the Spanish armies, as they were then constituted, to keep the field against the French. The following passage, which concludes his account of the military affairs, does not leave me, who really believe that much of this deficiency of numbers, composition, and discipline, is to be attributed to the existing government of Spain. They have attempted to govern the kingdom, in a state of revolution, by an adherence to old rules and systems, and with the aid of what is called enthusiasm; and this last is, in fact, no aid to accomplish any thing, and is only an excuse for the irregularity with which everything is done, and for the want of discipline and subordination of the armies. People are very apt to believe that enthusiasm carried the French through their revolution, and was the parent of those exertions which have nearly conquered the world; but if the subject is nicelv examined, it will be found that enthusiasm was the same only, but that for a short period which has been passed with those r e s o u r c e s under the system of terror, which first stopped the Allies; and that a perseverance in the same system of applying every individual and every description of property to the service of the army, by force, has since conquered Europe. The French army, in Spain, as they did everywhere else, was that of taking possession by force or everything they wanted. They ordered rations at every town, and they arrested, shot, or hanged all who put any obstacle in their way. The English generals, the allies of Spain, could not be spared adverse advice. O'Donnell was assisted by the nature of the ground, which was interspersed with numerous fortresses, and also by the British squadron along the coast, and by the organisation and faculty for rapid operations which the British army is capable of. The Spanish provincial was too remote to have any influence on the operations in Portugal and Andalucia. The conquest of Portugal was the great object of the French campaign of 1810.

About the middle of May Marshal Massena, Prince of Essling, arrived at Valladolid, having been sent by Napoleon to take the command of the army assembled in Old Castile and Leon, which assumed the name of the Army of Portugal. He had also military command over the provinces of northern Spain. His force consisted of the corps of Junot, the reserve cavalry under Monbrun—is of 72,000 men under arms for the field, besides garrisons, detachments, &c., in the provinces of Valladolid, Burgos, Segovia, and Palencia. This army, which was detached from the course of the campaign, the 9th corps, under Dross, consisting of about 18,000 men, Lord Wellington had to oppose the whole of this force with about 54,000 British and Portuguese regular troops. There was moreover a considerable Portuguese militia, employed mostly in the peninsula, and in the provinces beyond the Duero, in Lepe and Algarve—in short, on the wings of the regular force, it must be observed also that Massena could concentrate his whole force for his attacks on Portugal and Tagus, whilst Lord Wellington was obliged to leave part of his force south of that river, to guard against any sudden movement from the French army of Andalucia, which was less than 80,000 strong, of which a part might attempt to march into Alentejo. Again, Massena's troops were mostly old soldiers, flushed with success and in a high state of discipline, whilst Lord Wellington could only constantly rely upon British part of his force, about 25,000 men, as the Portuguese regular army was yet nurtured, and the men were dear to them. Wellington has been described in the eyes of the field. Marshal Beresford however had taken great pains with the Portuguese regulars, many of the officers were English, and Lord Wellington had bridged several of the rivers which it was necessary to cross during the operations. Early in June the French invested Ciudad Rodrigo in sight of the British advanced division, which was posted on the Arua. On the 25th they opened their batteries, and the Spanish governor, a brave old officer, defended them till the 10th of July, when, a practicable breach being made
the French entered the place by capitulation. Wellington could not risk his army for the relief of Ciudad Rodrigo: its object was to defend Portugal, and, above all, Lisbon. He states in the clearest manner his reasons for not attempting to relieve Ciudad Rodrigo in his despatch to Lord Hill in the morning of the 15th. He was advised in answer to the charges in the French 'Moniteur.' He retained his position on the left bank of the Coa, and the French advanced to that river, and in so doing the corps of Massena, under Generals Soult and Moncey, encountered the British light division of Massier, General Trumulo, who, being in possession of a much superior force, and lastly effected his retreat by a bridge across the Coa, which the French unsuccessfully attempted to pass. The fire of the British killed and wounded about 1000 of these French, and left the river, and was useless, though it gave Massena a specimen of the resistance that he had to encounter in his march to Lisbon, which was the declared object of his expedition. On entering the frontiers of Portugal, after taking Ciudad Rodrigo, Massena issued a proclamation to the Portuguese in the usual style of French proclamations of those times, abusing the English as the cause of all mischief, and attributing the crimes of an English army in Portugal to the "insatiable ambition" of England. He entered at the English for not allowing the French, with whom they knew they could not have done in the face of an enemy three times as strong. Massena ended by recommending to the Portuguese population to remain quiet, and receive the French with hospitality as well as another nation, and for their persons and property. How this last promise was kept from the beginning is stated by Lord Wellington in a counter-proclamation which he issued a few weeks afterwards, dated Celorico, August 4th:—"The time which has elapsed since the access of the French to the left and the right of the English position; one French column reached the top of the ridge, and was in the act of d-playing when it was repulsed by General Picton's division, as far as the next village, which they attempted to take and on the left the French were likewise repulsed and thrown down the hill by a charge from the bayonet of Craufurd's division and a Portuguese brigade. The French lost one general and about 1000 killed, two generals and about 5000 wounded and 3000 prisoners. The loss of the Allies did not exceed 1300. This movement," says Wellington, "has brought the Portuguese levies into action with the enemy for the first time in an advantageous situation, and they have proved that the troops of Portugal are for the time being thrown away, and that they are worthy of contending in the same ranks with British troops in this interesting case, which they afford the best hopes of saving." ('Dispatches,' vol. iv., p. 470.)

One of the moves of Lord Wellington in fighting the battle of Busaco was to give time to the population of the country in his rear to remove out of the way of the enemy with their goods and provisions, especially from Coimbra, a populous and wealthy town, but the orders given to effect it were ill obeyed. Massena did not attempt again to force the position of Busaco, but moved off his army by the pass of Balseval, in the mountains north of Busaco. Lord Wellington had directed Colonel Trant to occupy this pass as soon as the French army had crossed the river, but, and arrived too late and with too small a force to arrest the march of the French, who descended into the maritime plains, and seized on the road leading from Oporto to Coimbra in the rear of the British.

On the 5th of September the Allies quitted the position of Busaco, and, crossing the Mondego, began their retreat towards Lisbon. On the 1st of October the British rear-guard, after some skirmishing with the French, evacuated Coimbra, accompanied by all the remaining inhabitants, who were away with whatever they could carry, and the sick, the aged, and the children, on carts, mules, and donkeys, not knowing whether they were going, and encumbering the road, whilst the French cavalry was hovering on the flanks and pins, not in a position to protect those who saw it can never forget. The French entered the forsaken city, where they found ample stores of provisions. On the 2nd of October Lord Wellington's head-quarters were moved to Leiria, where he stayed two days, the French marched away, as if they were giving up the retreat with great ease and regularity. General Hill with his division moved by Thomar and Santarem, the centre of the army by Leiria and Rio Mayor, and the left by Alcanena and Odivelas. Massena followed in one column by the centre or Rio Mayor road; but the French had gained a position of place between his advanced guard and the light division which formed the British rear. On the 8th the allied army entered the lines which had been prepared for them, just as the autumnal rains, which fell heavily in Portugal, were beginning to set in. Never was a retreat, before a formidable enemy, effected with more ease or so little loss.
On the 10th of October the whole army was within the lines.

The line of defence was double. The first, which was 29 miles long, began at Alhendra on the Tagus, crossed the valley of Arna, which was rather a weak point, and passed along the skirts of Mount Agraço, where the town, a large and strong re-look: it then passed across the valley of Zibeira and skirted the ravine of Rana to the heights of Te-Me Vedres, which were well fortified; thence the line followed the course of the little river Zindara to its mouth on the banks of the large river Zibreira. The second line was fixed corresponding with every part of the position.

The second line, at a distance varying from six to ten miles in the rear of the first, extended from Quintellas on the Tagus, by Bucelles, Monte Chique, and Mafra, to the mouth of the little river S. Lourenço on the sea-coast, and was 94 miles long. This was the stronger line of the two both by nature and art, and, if the first line were forced by the enemy, the retreat of the army upon the second was secure at all times. Both lines were secured by breastworks, abatis, strong redoubts and earthworks, and defended with a salient line in the rear. There was a line to secure the embarkation of the troops, should that measure become necessary, enclosing an en-trenched camp and the Port of S. Julian. More than 100 redoubts and 600 lines of bivouacs were scattered along these lines. Lord Wellington had received reinforcements from England and Cadiz; the Portuguese army had also been strengthened, and the Spanish division of La Romana, 5000 strong, came from Estremadura to join the army. The Portuguese artillery, which had been the last, was rapidly repaired and mounted. It was manned by engineers and armed with the most modern gun-boats flying the right of the British line. Altogether these lines of defence were of stupendous strength, conceived by the military genius of Lord Wellington, and executed by the military skill of the British engineers.

Massena seems to have been taken by surprise at the sight of the lines, and he employed several days in reconnoitering them. He made some demonstrations in order to make the British divisions show out their force; but after one or two slight attacks, which were repulsed, he made no further attempt. He put the second and eighth corps partly in the villages and partly in bivouac in front of the right and centre of the British position, leaving the sixth corps at Olta in his rear. The siege batteries, which had been left behind and commenced forming magazines at Santarem, for this purpose sent moveable columns to scour the country for provisions, for he had entered Portugal without magazines, and had only six days' supplies, which many however threw away or wasted on the road. The country had been partly stripped by the inhabitants, who had retired to the mountains or within the lines, and the French foraging parties destroyed what was left, so that for many leagues in rear of the French the country became a scene of devastation and almost a desert. In addition to this, the Portuguese militia under Trant, Millar, and Wilson, came down from the north and cut off all communication between Massena's army and the lines of the Spanish frontier. Whilst the French were in march for Leiria, the British troops began to arrive at Oporto, Coimbra, seized many prisoners, and all the sick and wounded, between four and five thousand in number, whom he removed to Oporto. Trant and Wilson came down towards Ourem, Thomar, and the banks of the Zêzere, having in the rear of Massena, who was obliged to retreat back a whole division to hold them in check. Towards the end of October, Massena sent 2000 men across the Zêzere, but these were easily disposed of with a strong escort by way of Pesuaco to Ciudad Rodrigo, whence he hastened to Paris to inform Napoleon of the real state of affairs in Portugal.

There was now no idea of attempting the force the British lines unless he received large reinforcements. He had entered Portugal with about 70,000 men, of whom 15,000 had been either killed or taken prisoners or were in the hospitals; his army had become very sickly in consequence of privations and of being exposed to inclement weather mostly without shelter, and bivouacking in low grounds. On the 10th of November he began a retrograde movement, with great order and caution, for the purpose of giving his army a respite from the winter. On the 14th the French second corps was established at and near Santarem, in a very strong position; the eighth corps at Pernes; and the sixth corps at Thomar, farther in the rear. Massena's head-quarters were fixed at Tomar, and his general division was placed on the left bank of the Tagus, opposite Santarem. Wellington's head-quarters were fixed at Cartaxo. Both armies were now in cantonments for the winter. The ended the campaign of 1810. As a defensive campaign on the part of Lord Wellington it was successful, for the French army at the end of that year held no other ground in Portugal than that on which its divisions stood, being hemmed in between the northern bank of the Tagus, the Rio Mayor, and the ridge of the Serra de Estrela, having the allied army in front of it. These lines were already strengthened on its rear, and its communications with Spain intercepted

All the north of Portugal was free from the French, and also the whole of the kingdom south of the Tagus, and the whole of the country west of the Serra de Estrela, the people of that part of Portugal rejoicing to have rid themselves not only of the French, but of their Mozarabic faction, and carried off the provisions; but the population east of the mountains, and between them, the Tagus, and the Zêzere, had remained in fancied security; so that, when Massena withdrew his army to that quarter, he found the towns of Thomar, Oporto, Coimbra, Abrantes, in possession of the Allies, as well as all the fortresses, with the exception of Almeida. As the French had advanced by the valley of the Mundeio and the country west of the Serra de Estrela, the people of Portugal had done all in their power to support him and helped him in every way. All our military arrangements are useless if they can find subsistence on the ground which they occupy. Then the boats are left at Santarem in order to give the enemy an opportunity of acting upon our faults. It is not easy to break to the populace the advantages which we have obtained, and that I should advise the King's Government to withdraw the assistance which his Majesty affords them, if they interpose in any manner with the appointments of Marshal Beresford, who has been assigned to the command of the divisions of the army; or with any of the points which, under the original arrangement with Marshal Beresford, were referred exclusively to his management. I propose also to report to his Majesty's Government, and refer to their consideration the duty which is at present incumbent on the Government to refuse or delay to adopt the civil and political arrangements recommended by me, and corresponding with
the military operations which I am carrying on. But it appears that the Portuguese Government have lately discovered that we are all wrong; they have become impatient for the defeat of the enemy, and, in imitation of the Central Junta of Spain, call out for a battle and early success.

In another letter, dated Rio Mayor, October 6, addressed likewise to Mr. Stuart, the junta of Portugal spoke to me of the field that, luckily, I hurried about and that shall be seen. You will do me the favour to inform the Regency, and above all the Principal Souza, that, his Majesty and the Prince Regent having intrusted me with the command of their armies, and having assured me of their support, if I do not suffer them, or anybody else, to interfere in them; that I know best where to station my troops and when to make a stand against the enemy; and I shall not alter a system formed upon mature consideration upon any suggestion of their Highnesses, but will preserve the tranquillity, I recommend them to look to the measures for which they are responsible, and which I long ago recommended to them, viz. to provide for the tranquillity of Lisbon, and for the food of their own army and of the people, while the troops are to be engaged in the enemy. Campanarios of 1811. During the months of January and February the armies in Portugal remained in the same respective positions. The low lands being flooded rendered field operations impossible. Meanwhile the 9th corps under Drouet had entered Portugal by the valley of the Mondego, and was reinforced by some additional troops. Thus reinforced Massena’s army, by being posted on its right about Leiria. At the same time Soult, who commanded the army of Andalucia, received orders from Napoleon to act in concert with Massena, by attacking Portugal south of the Tagus; and was reinforced by the divisions of Soult, consisting of about 70,000 men, and placed under Marshal Bessières, duke of Istria, who ordered to support and furnish all necessary assistance to the army of Portugal.

Letter from Berthier, Prince of Essling, to the Prince of Essling (Massena), Paris, January 16, 1811; and another from the Duke of Dalmatia (Soult), January 24, 1811; and another from the same to the Prince of Essling, February 7, 1811; in Appendix to Napier, vol. iii. "Make a bridge on the Coa and link up with Soult. Let the Soult form a junction. Meanwhile keep the English in check, and make them lose men every day by engagements of the advanced guards. Their army is small, and they cannot afford to lose many men. Besides, people in London are aware of the idea of crossing the Mondego and invading Portugal, and they must be convinced. Mountbrun had a detachment of the bridge, and placed guards at the ford, but they determined to defend the town, thinking that, if he could carry a sudden assault, Massena could not stay long on the left bank of the Mondego with the allied army at his heels. On the 11th of March Mountbrun, reinforced by the Portuguese militia, took the town by storm, and on the 12th made an attempt to force the bridge, but his men were repulsed by grape-shot. Mountbrun fancied that Trant had been reinforced with some English regiments by sea, and having made his report, Massena relinquished the idea of crossing the Mondego, and sent a division by Ponte de Mincelves and the left bank of the Mondego. Thus Coimbra was saved from the impending visitation. Massena resumed his retreat on the 13th of March in rather a hurried manner, being on the point of having his left flank turned by the Portuguese army. When in the path over the mountains of Anciso, Ney, in command of the rear-guard, set fire to the town of Condeixa, in order to stop the British artillery, but the light division pursued the retreating enemy, and penetrated between their columns, till night was coming to an end, and then began to press the French very hard. By the morning of the 14th, when the fog which enveloped the mountains began to clear off, Ney was seen posted on a hill near Casal Nova. The light division attacked him; and Picton’s and Cole’s
On this rear-guard the French retired with admirable precision from ridge to ridge, covering his rear with guns and light troops, until he gained the strong defiles of Miranda de Coimbra and the banks of the river, and leaving Ney to cover the passage of the river, without however risking an action. Ney remained on the left bank, and took up a position near the village of Fons de Arronc. The Allies, coming up about noon, encamped in a wood in which they were intercepted by the means of carrying provisions along with the army. Nothing could be got from the country, which had been twice ravaged. Some of the Portuguese brigades were actually starving; many men fell off and died, and to save the rest of the army from the same hardships British commissary-general's means were thus overlaid, and the whole army suffered in consequence. (Dispatches to Charles Stuart, dated Louzio, March 16, and Pombeiro, March 18, and another to the Earl of Liverpool of March 16.)

On the 17th the French armament at the pont of a trestle bridge, the French having withdrawn in the night.

Massena had taken up a strong position on the river Alva, another affiliate of the Mondego, which was swollen by the rains, and had destroyed the bridge of Marcella, apparently intending to remain there some days. He had also sent detachments to scour the neighboring country for provisions. But Wellington marched three divisions by the mountains of Quiteria to Arganil, on the Upper Alva, which movement obliged the French to retreat. At Condeixa, the French intended to throw a barrier along the river, but Wellington had already passed by the pont of a trestle bridge, the French having withdrawn in the night.

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In the mountain valleys of the Serra de Estrela, the work of destruction had been carried on by the French during the winter of 1810. The British were searching for provisions in those sequestered valleys, and when they fell upon a hamlet or farm-house they showed no mercy to the inmates. Sometimes in the mountains they encountered several families huddled together in a cave, with their women and children, and when the weather was bad, they were soon dislodged—the females pared for a time, but not in mercy. It happened however that times these marauding parties were small, and they were overpowered by the peasantry, who gave no quarter.

Lord Wellington having placed his army in cantonments between the Coa and the Agueda, and made arrangements for the blockade of Almeida, set out for the south to see the state of his troops, and, at the same time, detach a force to the south, and, with the aid of the allies, laid the troops in Almejto, in the absence of General Hill, who had gone home on leave. The Spanish General Menjízabal, having been utterly defeated by the French in the preceding February, Scott had invested the place in such a manner that it was only 8000, voted by the British Parliament, and by subscriptions raised in England. After the retreat of Massena they returned to their homes, when the poorer classes received articles of clothing during the remainder of that year and the following winter.

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up Viana d'Avé and his communication with Sbangal, and ordered the 7th and 8th divisions to retire across the plain, and take up a new line on a ridge which runs from the Du Casa and Toreno, nearest at right angles with the original position. The village of Fuentes de Oñoro thus became the left of the new position, and the right of the French, beyond the Toreno, and between that and the Guadarrama. This movement was well executed, though under very critical circumstances, for the British squares had to cross a vast plain, exposed to the charge of a numerous French cavalry supported by small but well-ordered British infantry, and too weak in numbers to offer any real protection. The non-combatants, who had gathered behind the British line, were hurrying away, driven by the French horsemen across the plain. Colonel Napier says that "in all this war there was not a more dangerous hour than this, and the whole position of the British, the Toreno, was covered with a confused multitude, amidst which the squares appeared but as specks; for there was a great concourse, composed of commissariat followers of the camp, servants, baggage, led horses, and peasants attracted by curiosity, and finally, a great number of men coming out of the woods. The 7th division was separated from the army by the Toreno; 5000 French cavalry, with fifteen pieces of artillery, were close at hand impatient to charge; the infantry of the 6th corps was in order behind the same, and the wood was covered by the skirmishers of the 6th corps; and if the latter body, pivoting upon Fuentes, had issued forth, while Drouet's divisions fell on that village, while the 6th corps attacks the light division, and while the whole of the cavalry made a general charge, the British squares would have been driven violently in upon the 1st division, in such a manner as to have intercepted the latter's fire, and broken their ranks. No such effect however was made; Montbrun's cavalry, moving bow down but finally, squares, the plain was cleared, the cavalry took post behind the centre, and the light division formed a reserve to the right of the 1st division, sending the riflemen among the rocks to connect it with the 7th division, which had arrived at Fuentes, and was to both sides of the village. Sanche's cavalry, however, formed a new front, so finely lined with troops, the French stopped short, and commenced a heavy cannonade, which did great execution, from the closeness of the allied masses; but twelve British guns replied with vigour, and the violence of the enemy's fire abated; their cavalry then drew out of range, and a body of French infantry attempting to glide down the ravine of the Toreno, was repulsed by the riflemen and light companies of the Guards. But all this time a force battle was going on at Fuentes de Oñoro. Massena had turned his head to the right, and the British were this moment attacked by the 10th division. When Montbrun's cavalry should turn the right wing. It was, however, two hours later ere the attack commenced. The three British regiments (24th, 71st, and 79th) made a desperate resistance; but finally, having been broken, they retired to the desultory fighting of light troops, they were pierced and divided: two companies of the 79th were taken, Colonel Cameron was mortally wounded, and the lower part of the town was carried: the upper however was still held, and the rolling of the musketry was incessant. Had the attack been made earlier, and the whole of Drouet's division thrown boldly into the fight, while the 6th corps, moving through the wood, closely turned the village, the passage must have been forced, and the left of the new position outflanked; but now Lord Wellington, having all his reserves in hand, detached considerable masses to the support of the regiments in Fuentes. The French continued also to reinforce their troops, until the whole of the 6th corps and a part of Drouet's division were engaged, when several British regiments, particularly the 36th and 22nd, which were on the banks of the stream, and amongst the lower houses; another upon the lower heights and round the church, and some of the enemy's skirmishers even penetrated completely through to the main body; but before the village was carried, it was relieved by its defenders; and in a charge of the 71st, 79th, and 88th regiments, led by Colonel Mc'Kinnon, against a heavy mass which had gained the chapel eminence, a great number of French fell. In this manner the fight lasted until evening, when the lower part of the town was abandoned by both parties—the British maintaining the chapel and crape, and the French retiring a cannon-shot from the stream. ('History of the Peninsular War', iii. 514-16.)

The total loss of the British was 226 killed, 1234 wounded and 317 missing or taken prisoners. The loss of the French was also very great; nearly 6000 dead bodies found in the village. No fighting of any consequence occurred on the left of the British position, where the fifth and sixth divisions were posted to protect the blockade of Almeida, the second corps of the French merely waiting the issue of the battle at Fuentes de Oñoro, and watching for an opportunity of throwing provisions into Almeida, which however did not occur. The battle of Fuentes de Oñoro was of the utmost importance, being a regular pitched battle fought by the French, who were certainly greater, judging from the vast number of the British, and from the strength and size of the French army, against three French corps of infantry and 5000 cavalry. Massena fought the battle for the purpose of relieving Almeida, but he failed, and Almeida a few days afterwards was evacuated by the French garrison in the British. With this battle General Beresford closed his long and arduous career. He withdrew his army beyond the Aeguida, and soon afterwards Marshal Marmont, duke of Ragusa, arrived at Salamanca to supersede him. The order of Napoleon by which Massena was directed to give up the command to his brother-in-law, was to be performed as soon as the latter was allowed to take with him to France his son and one of his aides-de-camp only. Marmont was told to take the reins of command with a firm hand. ('Napier, 'Peninsular War, vol. viii., Appendix viii., p. 629.')

While the battle was happening in the north, Marshal Beresford had invested Badajoz, when Soult marched from Seville to relieve that place. On the 13th of May, Beresford raised the siege, removed his artillery, platforms, and stores, and prepared to march towards the Mondego. He advanced on the ridge of Alberca with above 7000 British infantry, four Portuguese brigades, and Blake's Spanish corps, in all about 30,000 infantry and about 2000 cavalry, but hardly one-half of this force could be depended upon in the field. He had with him the 8th division, and the 9th and 7th divisions were to follow. The French however had with them about 12,000 men. Soult came up with about 19,000 chosen infantry, about 4000 cavalry, and fifty guns. He immediately reconnaited Beresford's position, and determined upon an attack on the right flank of the Allies, which was their weak point, though Beresford had directed his chief attention to the centre, where he had placed his British troops. It was on the French part the same game as at the battles of Talavera and Fuentes; but Wellington was not there, nor were British troops at hand all along the line; and when Beresford, perceiving the immense superiority of the French, was about to face the French marching upon his right, Blake refused, saying that the real attack was against the centre by the bridge of Alberca. There was indeed an attack by the French on the right, but it was only intended to mask and support the grand attack on the left. It was only when the French actually appeared on the table-land on the right, commanding and enfilading the whole position of the Allies, that Blake consented, with much slowness, to change his front. In the mean time the French columns were already in possession of the table-land; their guns opened, and their cavalry outflanking the front, put the Spaniards in disorder, and they gave way. The brigades of the second division, British, were ordered to advance to the right; the first, and Coleman's brigade, while in the act of deploying, was attacked in flank and rear, and nearly destroyed by the French and Polish cavalry; the next, Hongton's brigade, reached the summit, and maintained a desperate struggle. But the men fell fast, ammunition failed, and General Beresford ordered the retreat. The retreat was an ruinous, when, at the suggestion of Colonel Hardinge, General Cole, with the 4th division, was ordered to march up the hill. It consisted of only two brigades, one Portuguese and one British (7th and 23rd regiments), commanded by Sir William M'Intyre; orders to General Beresford to restore the fight and save the army. General Cole directed the Portuguese brigade under General Harvey to move round the hill on the right, whilst Abercrombie's brigade, the last remaining part of the British, advanced to the west of the hill, which was crowned by the French masses and artillery. Six British guns were already in the enemy's possession, the whole French reserve was coming forward to reinforce their
front column, and what remained of Hougton's brigade could no longer maintain its position. The ground was heaped with dead bodies, and the Polish lancers were riding furiously about the captured artillery on the upper part of the hill. General Cole at the head of the flankers, flanked by a battalion of the Lunatic Legion under Colonel Hawk- 

haw, dispersed the lancers, captured the guns, and appeared on the right of Hougton's brigade exactly as Abercrombie's issued out on the left. We must now once more borrow Sir William Napier's eloquent pen:—

"Such a gallant line, issuing from the midst of the smoke, and rapidly spreading, completely disordered and startled the enemy's heavy masses, which were increasing and pressing onwards as to an assured victory: they vanished, hesitated, and then, vomiting forth a storm of fire, hastily endeavored to enlarge their front, as was really done by this overwhelming force, which was signalled through the British ranks.

Sir William Myer's was killed, Cole, and the three colonels, Ellis, Blakeney, and Hawkhaw, fell wounded, and the fusilier battalions, struck by the iron tempest, receded. But the French, in one rush, and with the sudden burst of undisciplined valour, no nervous enthusiasm, weakened the stability of their order; their flashing eyes were bent on the dark columns in their front; their measured tread shook the ground; their dreadful volleys swept away the haf of every-formed line, and marched and recovered, they closed on their terrible enemies, and then was seen what a strength and majesty the British soldier fights.

In vain did Scott, by voice and gesture, animate his Frenchmen; in vain did the hardest veterans, extiricating themselves from the dug-well of the trees, urge the gain time for the mass to open out on such a fair field; in vain did the mass itself bear up, and, fiercely raising, fire indiscriminately upon friends and foes, while the horsemen, dancing on the flank, threatened to charge the advancing lines. But the French continued to resist the attacks, and, as the enemy advanced, endeavor to sustain the attack; their efforts only increased the irresistible confusion, and the mighty mass, giving way like a loosened cliff, went headlong down the ascent. The rain flowed as thick as raindrops, showered with blood, and among the wounded men, the remnant of 6000 incomparable British soldiers, stood triumphant on the fatal hill." (Napier, "Peninsular War," III., 640-1.)

The day was now won, and Beresford ordering the Portu-guese infantry to take post on the right, and the French retreated confusion across the small river on which stands the village of Albuera. About three o'clock the fire had ceased. The allied army had lost in killed and wounded about 7000 men, of whom two-thirds were British. The French lost about 8000 men, including prisoners and killed. On the 16th of May the two armies remained in their respective positions, and Beresford waited in anxiety for another attack, when he had hardly British soldiers enough for his piquets and to take care of the crowd of wounded. On the 17th however he was reinforced by an English brigade, and the following day Soult retired towards Seville, leaving 500 soldiers severely wounded to the generosity of the English.

On the 19th Wellington arrived from the north, followed by two fresh divisions, and gave directions to resume the siege of Badajoz. On the 5th of June, a breach being made in Fort St. Christoval, the assault was given, but failed. On the 9th another attempt at storming was made, which proved equally fruitless. On the 17th, however, with but so little assistance, the town was taken, and the Portuguese and the Salsamaca. Lord Wellington likewise, leaving General Hill with one British division and the Portuguese in Alem-tejo, and giving up the siege of Badajoz for the present, crossed the Tagus with the remainder of his army, and fixed his head-quarters at Fuente Gualinde, on the line of the Agueda. He was looking towards recovering possession of the important fortress of Ciudad Rodrigo, which his advanced parties surrounded and kept in a state of blockade. Towards the end of September, Marmont, having received large reinforce-ments from France, moved upon the Agueda, and by his superiority of numbers and especially of cavalry, obliged Lord Wellington, after a partial engagement at El Bodon, to withdraw his army, which he did in excellent order to his old position on the Cos, where Marmont did not choose to follow him. Nothing more happened after this on that side for the remainder of the year.
was surprised and carried; and on the 14th the convent of San Francisco, likewise situated outside the walls, was carried by assault. The second parallel was then completed, and fresh batteries being established, two practicable breaches were made on the 18th, and orders were given to storm the place. No time was to be lost, as Mar- mount was known to be advancing to relieve the garrison. A part of the light division under General Craufurd, on one side, and General Mackinnon’s brigade, supported by the 94th, D’Avenel’s, and the light infantry, on the other side, were directed for the breaches, whilst Colonel Pack’s brigade attacked the gate of St. Jago, and in less than half an hour from the time the attack commenced the Allies were in possession of the ramparts, and the garrison then surrendered. (‘Dispatches, i. p. 238.) The loss of the Allies was about 2,000 killed and wounded, and of the British about 1,000 killed and wounded. The loss of the garrison was estimated at about 1,000 killed, besides 1,700 prisoners. A large battering-train and a vast quantity of ammunition and stores were found in the place.

Marshal Marmont heard at Valladolid, on the 18th of January, of Wellington’s advance to Ciudad Rodrigo. He quickly recalled Bonet’s division from Asturias, collected his other divisions, and marched, as he thought, to relieve the place; but on arriving at Salamanca he heard of its fall. His astonishment was thus expressed in a letter to Bertrand: ‘My generalissimo! The English have opened fire at a great distance; on the 19th the place was stormed, and fell into the power of the enemy. There is something so incomprehensible in this that I allow myself no remarks, as I am not yet furnished with the necessary information.’

The English garrison, under General Hill, gave a vote of thanks to Lord Wellington, and conferred on him the title of Duke of Ciudad Rodrigo. In England he was raised to the dignity of Earl of Wellington of the United Kingdom, and parliament, besides a vote of thanks to him and his brave army, annexed to the title an annuity of £5000.

Having repaired in some degree the works of Ciudad Rodrigo, Lord Wellington placed it under the command of a Spanish governor, and prepared to move to the south, for he had before resolved to take Badajoz, and take Bonet to Cadiz. Marmont and Soult could unite for his defence. The artillery for the siege was embarked at Lisbon for a fictitious destination, then transhipped at sea into small craft, in which it was sent to Formos, and thence by land across Alemtejo to the banks of the Guadiana. On the 6th of March, leaving one division on the Aguera, Lord Wellington marched the remainder of his army to the south. On the 16th the army crossed the Guadiana, and Badajos was immediately invested, the cast, while several divisions advanced to Alerena and Merida to cover the siege. On the 20th, the Picurins, an advanced post, separated from the body of the place by the small river Rivillas, was taken by storm, and on the 28th two breaches batteries opened their fire on the town. In the meanwhile Soult was collecting his disposable force at Seville for the relief of the place, and Marmont, in order to effect a diversion, entered Portugal by Sabugui and Penamacor, and ravaged the country east of the Serra de Estrella. Lord Wellington accelerated the operations of the siege. On the 6th of April, three breaches having become practicable, orders were given for the assault in the evening. The various divisions passed the glacis under a tremendous fire from the garrison, which greatly thinned their ranks; and they descended into the ditch, and ascended the ramparts, where they were harried by musketry. 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The Spanish, like harrows, and chevaux-de-frise formed of sword-blades, effectually stopped the way, and the ramparts and neighbouring buildings were occupied by light infantry, who showed their volleys upon the assailants. The English, crossing the river Douro, were then under cover of the cast, and on the 28th the town was stormed, and the garrison of the Douro surrendered. On the 12th of April Lord Wellington moved the main body of his army back to the north, leaving General Hill south of the Tagus. Marmont, on hearing of this, gave up the idea of Almeida and Ciudad Rodrigo, and withdrew to Salamanca. Lord Wellington advanced to Granado, between the Cos and the Agueda, where they remained till the middle of June, nothing of importance occurring in that quarter during the interval. In the south, however, Wellington had reached the Tagus by the 20th of May, the forts which the French had constructed at Almater on the Tagus, where they had a bridge of boats to secure the communication between the Armies of the North and South. On the 13th of June Lord Wellington, having completed his preparations, moved to the plain of Alemtejo, and thence to Alcacer do Sal, and then to the battle-field of Vittoria, where he chose a position somewhat like that of Fontainebleau, with 13 out of 25 of his canteens with about 40,000 men, leaving General Hill on the Tags, near Almarat, with about 12,000 men. On the 17th he appeared before Salamanca. Marmont retired on his approach, and left about 7000 men in some fortresses which were speedily invested by the Allies under hospitalities, and proceeded by the river Tormes. The allied army forced the river and entered the town, to the great joy of the inhabitants. "They have now been suffering for more than three years, during which time the French, among other acts of oppression, expelled them into Spain, broke up 22 of their events, and 22 of their colleges, which existed in this celebrated seat of learning." (‘Dispatches, i. p. 339.) The forts were immediately invested, while Marmont’s army retired to the left bank and crossed the river Douro, and the British advanced up a position on the left of the river Tagus and crossed it, to Fort San Cristobal, which had been fortified. A British division was made to carry the forts by escalade, which failed, and Major-General Bowes and 120 men fell in the attack. On the 20th Marmont moved forward again, and, arriving in front of the forts, which were strongly entrenched with his cavalry in the plain, but ended merely in a skirmish. He made other demonstrations and movements in the following days for the purpose of relieving the forts, but was baffled by the watchfulness of the British general, until on the 24th the forts within Salamanca were taken and surrendered.

Marmont again retired to the Douro in the beginning of July, and took up a strong position on high ground along the norther end of the Douro, his centre being at Tordestillas. One British and Portuguese allied army took up a line on the left or southern bank of the river, facing the enemy. A great deal of manœuvreing, marching, and counter-marching, and changing of front, followed on the part of Marmont, during which the French marshals were reinforced by Desaix’s division, which had arrived from Italy. Marmont had marched over the mountains, having been harassed and pressed by the Spaniards from Galicia under Mahy and Portal. On the 16th of July Marmont threw two of his divisions across the Douro at Toro, when Lord Wellington moved his army, until on the 18th they attempted to cut off the right of the British army, consisting of the 4th and light divisions, but were repulsed by several charges of the British and Hanoverian cavalry, as well as of the British and Portuguese infantry. By his manoeuvres however Marmont succeeded in sinks.
lishing his communication with King Joseph and the army of the centre, which was advancing from Madrid to join him. In the mean time the two armies of Marmon and Wellington were in line on the opposite banks of the Guareña. More manoeuvring took place on the part of Marmon, who, on the 30th, crossed the Guareña on the right of the Allies, and advanced towards the Tormes by Babilafuente and Villamanua. Lord Wellington followed him with his army, and, on the 21st, overtook it near the village of Marmont, and, on the 22nd, occupied the plains of Salamanca, in line of battle. Lord Wellington, in his dispatch to Earl Bathurst dated the following day, July 21, observes as follows—'The enemy's object hitherto has been to cut off our communication with Salamanca and Ciudad Rodrigo, the two chief points of the enemy's retreat. The wheat-harvest has not yet been reaped in Castile, and even if we had money we could not now procure anything from the country, unless we could follow the example of the French, and lay waste whole districts in order to procure a subsistence. Indeed I believe that the French army is the twelfth strongest, and it is certainly equipped with a profession of artillery double ours in number, and of larger calibres. It cannot therefore be attacked in a chosen position without considerable loss on our side. To this circumstance add the disorganisation of our army, especially in the rear, occasioned by the King's, which will be 10,000 or 12,000 men, with a large proportion of cavalry, and that troops are still expected from the army of the north, and some are ordered from that of the south; and it will be seen that I ought to consider it almost impossible to attack the enemy; but I will not hesitate to move them in a new position nearly at right angles with the enemy's line. His cavalry was numerous, and his artillery formidable. Lord Wellington directed a fresh attack, and the 6th division, ascending to the enemy's position under a sweeping fire of musketry, charged with the bayonet, and the 4th division coming up at the same time the French abandoned the ground in great confusion, retreatting towards Alba de Tormes, followed closely by the British till night stopped the pursuit, which was renewed by the ring-bell, led by General Vandeleur. The cavalry came up with the French rear near Laserna, when three French battalions surrendered, being forsaken by their own cavalry. Clausel retired by Peñasanta to Arevalo, whence he took the direction of Valladolid. The loss of the French was 2,153 killed and wounded. The Allied losses were, in general, six field-officers, 130 officers of inferior rank, and between 6,000 and 7,000 men taken prisoners, besides two eagles. Their total loss in killed and wounded could not be ascertained. The Allies had 294 killed and 4270 wounded. It is not possible to attribute to the military and political consequences of that battle the ultimate loss of Spain by the French. (Thiobaud, 'Histoire de l'Empire,' ch. 63.) Among the political consequences must be reckoned the substitution of any tenacious of his party by one with a more moderate character, and the influence of the men in Spain, and even in the Cortes, to give up the English alliance, and make their peace with King Joseph, on condition of his acknowledging the constitution of 1812. The collection of the French in that year. The author just quoted says, 'We are assured that a negotiation to that effect had been entered into, which the battle of Salamanca broke off for ever.'

Lord Wellington, having crossed the Douro, reached Valladolid on the 30th of July, Clausel recommencing his retreat towards Burgos. King Joseph, with all the troops he could muster at Madrid, about 20,000, had marched by the Escorial on the 1st of July to join Marmon. On arriving at Arevalo he heard of Marmon's defeat, upon which he marched thither, and, deepening his retreat, offered a chance of some of Clausel's retreating army. Lord Wellington, recrossing
the Donro, marched against him on the 7th of August, leaving a force on the Donro to watch Clause. King Joseph retreated to Madrid, and the Allies occupied the Guadarrama range of the mountains, the capital and withdrew to the left bank of the Tagus, between Aranjuez and Toledo. Lord Wellington entered Madrid on the 12th, and was received with great acclamations. In consequence of this movement Somosierra, in the Castile line, which the French had constructed with so much labour and expense, and, abandoning western Andalucía, concentrated his forces in Granada. His rear-guard was attacked by an allied Spanish and English force from Cadiz, which drove it from its position in Seville. Wellington, with 70,000 men, had advanced to the walls of Seville at the same time advanced from the banks of the Guadiana to the Tagus, connecting his operations with those of the main body of Lord Wellington's army. On his approach King Joseph abandoned Toledo and fell back to Almansa, in Murcia, to keep himself in communication with Soult and Suchet. A great part of southern and central Spain was thus freed from the French, who never retook Seville; and this was another result of the battle of Salamanca.

The situation of Lord Wellington at Madrid was however critical. Clausey's army had been largely re-inforced, and Soult, and Suchet, and King Joseph, by forming a junction, might advance from the south, and thus the Allies would be attacked by a combined force nearly treble in numbers. In the north the Andalucía line was not more than 6000 men, part of whom were foreign auxiliaries, was cooped up in Alcaniz, and could not effect any powerful diversion. There was no Spanish force of any magnitude upon which Lord Wellington could depend for field operations. The Andalucía line could only be supported by the most effective Spanish corps, after taking Astorga, had advanced towards Zamora, but was driven back by Clausey. Ballasteros, who commanded a Spanish force in Andalucía, refused to be directed by Lord Wellington, and O'Donnell had been defeated in Murcia by disorder and division. At Madrid Lord Wellington was treated with enthusiastic admiration, but no active exertions were made in the common cause. The country was exhausted, the people appeared disheartened, and the British commander-in-chief was possessed of little money, the banks of the treasury, a sum of money adequate to his most pressing wants. To remain at Madrid was therefore impracticable; he must either advance to the north against Clausey, or to the south against Soult, and he determined on the first of these movements, for the purpose of sinking a blow at Clausey before the French in the south and east could advance to his support. Leaving two divisions at Madrid, be marched with the remainder on the 1st of September for Valladolid, who had been defeated by him and driven towards Burgos, was joined at Palencia by the Spanish army of Galicia, which scarcely mustered 10,000 men, undisciplined and deficient in equipment. On the 19th the allied army entered Burgos, and the French, under General Soult, who had been defeated upon the walls of Briviesca, leaving 3000 men, under General Dalretorn, in the Castle of Burgos, strong by its position, which had been fortified with care. The possession of that fort was necessary for the security of the allied army in its present advanced and insecure position, and Lord Wellington directed it to be invested forthwith, though he was ill furnished with siege artillery. A horn-work on a hill, which commanded several of the works of the castle, was carried by assault. The fort itself was battered, but without little effect, and assault was therefore given up. On the 19th his Grace was medically attended in the outer wall by the explosion of a mine, an attempt was made to storm it, but failed. Another breach was effected in like manner on the evening of the 4th of October, and the troops with which were employed within the exterior line of the works of the castle. The garrison made two sorties, by which they materially injured the works of the Allies, and occasioned them great loss. Want of ammunition greatly retarded the operations of the garrison. A breach at last being effected, by mining, the second line on the 10th, orders were given to storm it. A detachment of the King's German Legion carried the breach, and a detachment of the Gardes succeeded in esca- lading the line; but the enemy brought such a fire upon them from the third line and from the body of the castle, and attacked them with numbers so superior before they could be supported, that they were obliged to retire with considerable loss. But now the French army of the north advanced with evident intention to raise the siege; and on the same time Lord Wellington learnt from General Hill, that the Russians and垣is general Ballasteros had not assumed a position in La Mancha, which the Spanish Government, at Lord Wellington's suggestion, had directed him to hold. The British commander was therefore under the necessity of abandoning the siege of Burgos, and of effecting a retrograde movement in order to draw near to General Hill, who was at the approach of Soult abandoned Madrid and retired slowly towards the Tagus.

On the 21st of October the siege of Burgos was raised and Lord Wellington retired in good order to Palencia, and was joined by a brigade from England under Lord Dalhousie, which had landed at Coruña. The French, under Soult, devotedly attacked the rear-guard of the Allies until they reached the Douro at Tudela, when Souham halted, waiting to be joined by Soult from the south. Lord Wellington continued his retreat to the Termes, being joined on the 3rd of November by General Hill. On the 8th of November, the roads were deep and impregnated on the heights of San Cristoval, in front of Salamanca. On the 10th, Souham and Soult joined their forces, which amounted to 75,000 infantry and 12,000 cavalry, while Lord Wellington's army did not exceed 27,000 men, 13,000 of whom were Spaniards. The French crossed the Termes in force near Lucinhos. Lord Wellington took position at the Arapiles, being the ground of his former victory; but as the enemy, through his super- iority of numbers, and especially of cavalry, was in motion to the south of the British force, the Allies withdrew to the Agueda, and on the 18th his head-quarters were at Cindal Rodrigo. Soult did not follow him close; in fact, the French made no serious movement beyond the Termes, and soon afterwards they even withdrew a great part of their army from the left of the river, and fell upon them in better cantonments in Castile. The main army of the British and Portuguese were distributed in their old quarters within the frontiers of Portugal, their left resting at La mego on the Douro, while General Hill's corps moved to Salamanca and the French to S首创 and towards the Tagus, placing strong posts at the passes of Bajas and Bejar. The campaign of 1812 was now terminated. During the retreat from Burgos the allied troops suffered much fatigue and privation; the weather was very inclement, the roads were deep and impregnated with water, and the rivers were greatly swelled, and some of them were breast-high at the fords. Owing to the irremediable difficulty of obtaining provisions in Spain, a great part of the army had neither bread nor salt for days together. The soldiers were compelled to eat which they could not cook, but heated upon such smoky fires as they could make, and so ate it half raw. Many irregularities were committed by the soldiers, which Lord Wellington severely reproved in a circular letter which he wrote to the head-quarters officers of the army, and ordered to be read. Frenas, 26th of November 1812. (Dispatches, i. p. 682.) When the news reached England of the victory of Salamanca, Lord Wellington was advanced in the peerage by the title of Marquis of Wellington, Aug. 18, 1812. On the 3rd of December he received the thanks of Parliament, and on the 7th of the same month the sum of 100,000£ was voted to him as a reward for his services, and to enable him to support with dignity the rank to which he had been elevated.

Campaign of 1813.—Napoleon, having lost the best part of his army in his Russian expedition of 1812, not only could not reinforce his marshals in Spain, but thought it advisable to recall Marshal Soult, at the beginning of 1813, with 40,000 men, to work with his own forces against the allied campaign against the Russians and Prussians in Germany. Soult however only took about 20,000 men with him from the Peninsula. The French had still about 70,000 to oppose to Lord Wellington, and Marshal Suchet, whom the Russians in eastern Spain. The army still called the 'Army of Por- tugal,' under General Reille, had its head-quarters at Valla- dolid; that of the centre, under Dronet, was distributed round Madrid; and the head-quarters of the army of the south, formerly Soult's, were at Toledo. All these forces were under King Joseph, who was assisted by Marshal Jourdan. Clausey and Foy commanded separate divisions in Aragon and Biscay. Andalucía and Estremadura were
Free from the French, as well as Galicia and Asturias in the north.

Lord Wellington had been last appointed by the regency of Spain, with the approbation of the Cortes, to the rank of commander-in-chief of the Spanish armies, and measures were taken to render the Spanish troops more effective than before. A French corps was to join him, the army upon which he could immediately rely for field operations consisted of 65,000 infantry, British and Portuguese, and about 6000 cavalry. With this force he opened the campaign of 1813.

About the middle of May, Lord Wellington broke up from Burgos, crossing the Arga, to the north of the Douro. He marched upon the city of Navarre, and thence to València, taking Pamplona, crossed the Douro, and turned upon the enemy’s lines of communications. He divided his forces, and thus securing the position which the French had taken and had been at great pains to strengthen, along the northern bank of the Douro. The French were taken by surprise, not expecting this movement through Tras-os-Montes towards the north, without meeting an enemy. On the 1st of June, having crossed the Esla, he encamped near Zamora, the French retreating before him, and, being joined by Lord Wellington from Burgos, between the basins of the Duero and the Douro. The capital of Pamplona had been crossed the Douro at Toro on the 3rd of June, joined the rest of the allied army, which was likewise joined by the Spanish army of Galicia, and afterwards by another Spanish corps from the south under Clausel, who, on his way to the army, was dislodged by this rapid march of the Allies, and fearing to be cut off from their comrades in the north, hastily quitted the capital with King Joseph, his court, and retainers, and crossed the Duero at Puente, when the united French army retired to Burgos. Wellington, by marauding in front of the enemy’s right, thus enabling him to concentrate his forces by advancing the French abandoned Burgos, destroying the defences of the castle, and retreated by Briviesca to the Ebro, which was the line they intended to defend. They threw a garrison into the fortress of Panoceño in advance of the French army. The Allies, thus enabled to concentrate their men in forcing the passage of the Ebro in front of the enemy, moved his left by the road to Santander, through a rugged country, and directed it to pass the Ebro near its source by Rocamunde and San Martino, and then to follow the left or northern bank of the river towards Oma. The French position on the Ebro was thus turned, and the French fell back upon Vitoria after an engagement at Oma, in which they were defeated. The whole allied army, having passed the Ebro on the 16th of June, was enabled to take up its position near Vitoria, where the French had taken a strong position in front of the town, covering the three roads from Madrid, Bilbao, and Logroño, which united at Vitoria.

The two hostile armies were nearly equal in number, amounting to 70,000 to 75,000 men each. On the morning of the 21st Lord Wellington moved his army for the attack in three great divisions. The left, under General Graham, was directed by a circuitous movement to turn the enemy’s right by the Bilbao road; cut off its retreat by the Bayonne road; the right, under General Hill, was to commence the action by crossing the river Zadorra where the road from Madrid to Vitoria intersects the river, and to attack the enemy’s left on the high road between the valleys. These divisions, consisting of the 3rd, 4th, 7th, and light divisions, in two columns, was to attack the French centre. General Hill succeeded, after a severe contest, in carrying the heights of Subijana de Alava, when King Joseph ordered his left to fall back fast. Their retreat in good order towards Vitoria, where the French had taken a strong position in front of the town, covering the three roads from Madrid, Bilbao, and Logroño, which united at Vitoria.

When the news of the battle of Vitoria reached England, there were great rejoicings in the camp of the Field Marshal of England, which was appointed to the command of the French army. The French, which was considered an irretrievable disaster, was brought to an end on the 4th July, that the disasters of the preceding campaign were owing to the unskilful councils and unskilful dispositions of their late commanders. "Let us not, however," added he, "defraud the enemy of the peace and prosperity which the dispositions of their general have been prompt, skilful, and consecutive, and the valour and steadiness of his troops have been praiseworthy." He continued by saying that his instructions from the emperor Napoleon to "open to me the most advantageous opportunities to enable him proudly to survey our fertile valleys, and drive them across the Ebro. It is on the Spanish soil that your tents must next be pitched, and your resources drawn. . . . Let the account of your success be dated from Vitoria, and the birth of his Imperial Majesty be celebrated in that city.

Marshal Soult’s first object was to relieve Pamplona. With this view he collected the main body of his army at St. Jean Pied de Port, and on the 20th of July attacked...
with between 30,000 and 40,000 mon, the British right at Roncevaux. General Cole moved to the support of that post, but the French having turned the British position, General Cole considered it necessary to withdraw in the night, and march to Zurbiri. In the meantime two French divisions attacked General Hill's position in the Puerto de Maya, at the head of the valley of Baza. At first they gained ground, but were again driven back, when the retrograde movement was checked. General Hill was at last obliged to dislodge his troops, who being hastily supplied with provisions by their own government, and having the fresh recollection of the treatment which their countrymen in Spain had met with at the hands of the French, could only be retrained by the strongest measures from retaliating the wrongs of 1808. 

On the 10th of November the allied army left their cold and cheerless position in the high valleys of the Pyrenees, pressing on along a difficult and mountainous road. General Hill had a strong position on the Nivelle from St. Jean de Luz to Ainhoa, about 12 miles in length. General Hill, with the British right, advanced from the valley of Baza, and, attacking the French on the heights of Ainhoa, drove them 'round at a curve on the Nivelle, at the rear of their camp. On this the French highly advanced their ground and worked up on the left of the Nivelle, and in the night withdrew to their entrenched camp in front of Bayonne. Lord Wellington's head-quarters were established at St. Jean de Luz on the 13th, when a division of the Spanish army came to the assistance of the Allies; consisting of English and Spanish troops under Marshal BérESCO and General Alten, carried the works behind Sare, and drove the French beyond the Nivelle, which the Allies crossed at St. John's in the night. 

Up to this time the French had advanced their ground and works on the left of the Nivelle, and in the night withdrew to their entrenched camp in front of Bayonne. Lord Wellington's head-quarters were established at St. Jean de Luz on the 13th, when a division of the Spanish army came to the assistance of the Allies; consisting of English and Spanish troops under Marshal BérESCO and General Alten, carried the works behind Sare, and drove the French beyond the Nivelle, which the Allies crossed at St. John's in the night. Lord Wellington, being straitened for room and supplies for his large army, determined to cross the Nivelle and occupy the country between that and the Adour. On the 9th of December General Hill forced the Nive above Cambo, while the 6th division crossed at Ustaritz, and the French were obliged to retire, being cut off from their supply of provisions, which were on the other side. General Hill moved on the place of position, and in the night all their posts were withdrawn to Bayonne, and on the 10th the British right rested on the Adour. On that day Sout, resuming the offensive, issued out of Bayonne, and attacked the British left under Sir John Hope, which covered St. Jean de Luz, when the Allied head-quarters was established at Armenteiras. The French came on with great spirit, and twice succeeded in driving in the fifth division of the Allies, and twice were repulsed again, the first time by the 9th British and a Portuguese battalion, and the second time by the brigade of Guards. 

In the month of October, Lord Wellington moved his left across the Bidassoa upon French ground, and took possession of the hills called La Rhune. The French made only a slight resistance, as Marshal Sout had already fixed upon the line of the river Nivelle in his rear for a position. On the 31st of October the French garrison of Pamplona, 4000 strong, having lost all hopes of relief, surrendered themselves prisoners of war. Early in November Lord Wellington made his preparations for marching his whole army into France, and, after the conclusion of peace, found it prepared for the winter. Before however taking this serious step he issued an order of the day to all his troops of the various nations that composed his army, in which he told "the officers and soldiers to remember that their nations were at war with France since the 14th of May, and that all the time of that period the are to be at peace, and was forced to submit to this yoke; and not to forget at the same time that the worst of the evils suffered by the enemy in his profligate invasion of Spain and Portugal was occasioned by the irregularities of his soldiers and their cruelty towards the unfortunate and peaceful inhabitants of the country. To avenge this conduct on the peaceful inhabitants of France would be unnecessary and unworthy of the allied nations. But Lord Wellington's army was in a state of constant warfare with the general orders; he enforced them strictly and whenever he found any part of his troops attempting to plunder, he not only punished by military law those who were caught in the fact, but he placed the whole regiment or brigade under arms to prevent further offence. His greatest trouble was with the Spanish troops, who being badly supplied with provisions by their own government, and having the fresh recollection of the treatment which their countrymen in Spain had met with at the hands of the French, could only be restrained by the strongest measures from retaliating the wrongs of 1808. 

Nothing of importance occurred during the few remaining months of the year 1813. Both armies remained in winter quarters. On the 1st of January in this year (1813) Lord
Wellington had been gazetted as Colonel of the Royal Regiment of Horse Guards, in place of the Duke of Northumberland, who had resigned; and on the 4th of March he had been elected a Knight of the Garter of the Order.

Campaign of 1814.—The mighty contest which had been carried on for ten years between France and the rest of Europe was drawing fast to a close. The battle of Leipzig, October 16th, had decided the fate of the French Empire. Napoleon had lost another fine army which he had got together with great pains after the disasters of the Russian campaign of the previous year. The scanty remains of his forces were driven out of Germany across the Rhine; that river was to be the barrier of the now desperate Emperor. The natural frontier of France, but which he had not had self-command enough to respect. He was now reduced to the necessity of depending upon the resources of France itself. Wellington had long foretold that such a condition should come to be the test of the future. The Administration would turn against him. Napoleon had hitherto supported his enormous armies chiefly at the expense of foreign states.

On his return to Paris, in November, 1813, Napoleon decreed by a senatus consultum a new levy of 300,000 conscripts. In December he ordered the assembling of 180,000 national guards to garrison the towns and fortresses. He talked however of peace, but he hesitated, and lost time in naming, who had resigned; and on the 4th of March he had been elected a Knight of the Garter of the Order.

Wellington's preparations to drive the army of Soult from the country on the left of the Adour. About the middle of February, by a succession of movements and partial engagements, he drove the French first across the Bidassoa, and afterwards across the Gave de Golfe, an affluent of the Adour. On the 27th of February he met Soult's army concentrated at Orthez on the Gave de Pau, attacked and beat it, and pursued it to the Adour, the French retiring eastward towards Auch. On the 1st of March Lord Wellesley arrived at Bayonne, and the French army was assembled near the town. The loss of the Allies at the battle of Orthez was 277 killed, and about 800 wounded or missing. The loss of the French army was considerable during the battle, and still more during the retreat, owing to desertion having spread to a great extent, especially among the conscripts, who threw away their arms in vast numbers.

The battle of Orthez had important results. The garrison of Bayoue was now left to its fate, and the road to Bordeaux was open to the Allies. Lord Wellington gave orders to General Hougoumont, to detach Marshal Beresford with two divisions to occupy Bordeaux. On the arrival of the Allies at the latter city, the mayor and most of the inhabitants of their own accord, presented themselves to the British officers.

Lord Wellington's business was purely military. In the Spanish peninsula it was to drive the invader out of the country, and leave the people to settle their own affairs. In France, from a similar principle, he was extremely anxious not to countenance the civil war. The Duke of Angoulême having landed in the south of France to excite a movement in favour of the Bourbons, Lord Wellington advised him politicly to keep incognito, and to wait for some more important demonstration in his favour. When Beresford marched to Bordeaux, Lord Wellington directed him not to originate or encourage any rising of the Bourbon party.

"If they should ask you for your consent to proclaim Louis XVIII., to hoist the white standard, &c., you will state that the British nation and their Allies wish well to Louis XVIII.; and that the object of the Allies is to preserve the peace between our troops are stationed, we shall not interfere to prevent that party from doing what may be deemed most for its interest; say, further, that I am prepared to assist any party that may show itself inclined to aid us in getting the better of Bonaparte; that the object of the Allies is to preserve the peace in the war, and above all in entering France, as is stated in my proclamation, Peace; and that it is well known that the Allies are now engaged in negotiating a treaty of peace with Bonaparte; that, however I might be inclined to aid and support any set of people against Bonaparte while at war, I could give them no further aid when peace should be concluded, and I beg the inhabitants will weigh this matter well before they raise a standard against the government of Bonaparte, and involve themselves in hostilities. If however, notwithstanding this warning, the town should think proper to hoist the white standard, and should proclaim Louis XVIII., or adopt any other measure of that description, you will not oppose them; and you will arrange with the authorities the means of drawing, without loss of time, for the arms, ammunition, &c., you will deliver to them. If the municipality should state that they will not proclaim Louis XVIII. without your orders, you will decline to give such orders, for the reasons above stated." (Despatch of 1st March, 1814.)

On the 18th of March Lord Wellington sent his army to Vic Bigorre, and Soult retired to Tarbes, which he abandoned on the 20th, and continued his retreat to Toulouse, where he arrived on the 24th. On the 27th the Allies arrived on the banks of the Gave de Somme. The object of Soult was to facilitate a junction with Suchet, who was withdrawing his troops from Catalonia, in consequence of Ferdinand having been sent back to Spain, and acknowledged as King of Spain by Napoleon, who had reproached this new policy of them in order to waste discord among the Allies. Knowing the character of Ferdinand, he had written to him on the 12th of November 1813, saying, 'That the circumstances of the times made it his wish to conclude at once the affairs of Spain, where England was engaged, with a view to check the depressiveness of the nobility, in order to establish a republic. He (Napoleon) was much grieved to see the destruction of a nation bordering upon his empire, and whose maritime interests were closely connected with his own. He wished therefore to take in the interests of France in such a manner as to interfere in the affairs of Spain, and to re-establish the relations of friendship and good neighbourhood between the two nations.' (Thibaudeau, 'Histoire de L'Empire,' ch. 94.) A treaty was concluded at Valenpaj, where Ferdinand had been made a prisoner for five years, in which Napoleon acknowledged him as King of Spain and of the Indies, and promised to withdraw the French troops from Spain, whilst Ferdinand engaged to cause the English to evacuate the Peninsula.

At last, in the last month of March, Napoleon, being hard pressed for troops for the defence of France, and wishing to avail himself of the army of Suchet, which was uselessly cooped up in Cataluna, allowed Ferdinand to return to Spain. Meanwhile Suchet, who had already detached, early in March, 10,000 men to join Soult, made an offer to the Spanish Regency to withdraw all his garrisons from Catalonia, which were blockaded by Spanish troops, on condition that they be allowed to return to France with their arms. The Regency refused the offer, and Suchet, in pursuance of his own opinion, and he recommended them not to allow any capitulation to any French troops, except on the condition of their being prisoners of war. Suchet's garrisons amounted to about 18,000 men, mostly veteran soldiers, who, if they had been allowed to return with their arms, would have joined to his army. The object was strong for Wellington, a part of whose army was stationed before Bayonne and another part at Bordeaux. Suchet, with his disposable force of about 14,000 men, evacuated Cataluna, and re-entered France. In the beginning of April he placed his head-quarters at Narbonne, but did not join Soult.

On the 10th of April Lord Wellington, having crossed the Garonne the day before, attacked Marshal Soult in his entrenched camp on a range of heights between the rivers Garonne and Adour, near the town of Bayonne, the capital of the department of the Garonne, and the seat of government of the Porc, which they could not be dislodged without artillery. At the same time the Spanish division of General Foy held the attack against the French left with great spirit, but were at first repulsed; one regiment, however, the Tiradores de Castilla, maintained its position under the enemy's canister. The British light division moving up, the whole rallied, and again advanced to the attack. Marshal Beresford, having brought up his artillery, which had been detained by the badness of the roads, continued his movement along the ridge on the right of the French, and General Picton's brigade of the 6th division carried the two principal red-ants and fortified houses in the centre of the French position.
Soult made a powerful attack on the 6th division, which received it with the bayonet, when the French general Tempin was killed. At last the French were driven entirely from the heights, and withdrew across the island of Languedoc into the city of Toulouse, which Soult prepared to defend. The loss of the Allies at the battle of Toulouse was about 600 killed and 4000 wounded. The French acknowledged the loss of 3800 men.

On the 21st of May the 11th Marshal Soult evacuated Toulouse by the only road which was still open to him, and retired by Castelsarrai to Garonne. On the 12th Lord Wellington entered Toulouse, to the great joy of the inhabitants, who were relieved from the fearful apprehensions of a siege, and the fear of their property being sacked, burnt, and cockaded, and the people had pulled down Napoleon's statue and the eagles and other emblems of the imperial government. The municipality of Toulouse presented an address to Lord Wellington, requesting him to receive the keys of the city in the name of the inhabitants. Lord Wellington told them what he had told the people of Bonnereau, that he believed that negotiations for a peace were still being carried on with the existing government of France, and that they must judge for themselves the various prospects of an Armistice of April, to which he had been drawn by the desirability of the Bourbons, in which case it would be his duty to treat them as allies as long as the war lasted; but if peace should be made with Napoleon, he could not give them any assistance or protection afterwards. ('Dispatches,' xii., p. 626.)

On the 10th of May the Jäger, a French military band, was carried off to London by the Adjutant-General Colonel Cooke and the French Colonel St. Simon arrived from Paris, with news of Napoleon's first abdication, and of the establishment of a provisional government in the name of Louis XVIII. From Lord Wellington's head-quarters the two adjutants were sent to those of Marshal Soult, who did not think himself justified in submitting to the provisional government, having received no information from Napoleon concerning what had happened, but he proposed an armistice to Lord Wellington. The British commander wrote to him a very respectful letter, expressing himself as desirous of an Armistice, unless the marshal acknowledged the Provisional Government of France. The object of Lord Wellington was to prevent Marshal Soult and Suchet's armies becoming the nucleus of a civil war in France in favour of Napoleon's pretended brother, and to prevent the amalgamation of the Grand Armies, for pursuit Soult, if required. At last, on the 18th of May, Soult, having received from Berthier an order to stop all hostilities, concluded a convention with Lord Wellington. The British commander had proposed that the Grand Armies should be divided between the two armies. The head-quarters of Lord Wellington remained at Toulouse. Marshal Suchet concluded a like convention with Lord Wellington on the 19th, by which the final evacuation of Cataluna by the French garrison was promised to the British.

Before the news of the events of Paris reached Bayonne, the French made a sortie out of the entrenched camp in front of it, on the 14th of April, and attacked the lines of the Allies, who lost about 600 men in this affair, including General St. Simon, killed. General Suchet, the commander, and Sir John Hope, who was wounded and taken prisoner, General Stopford, of the Guards, was also wounded.

On the 30th of April Lord Wellington set off for Paris, whether he was sent back by Lord Castlereagh. He left General Hill in charge of the army. On the 13th of May he returned to Toulouse, and soon afterwards set off for Madrid, where the army had already taken different sides; O'Donnell and Elío for the king, and Freyre and the Prince of Sangronza for the constitution. Having in some degree quieted the commotion among the army, Spain was joined to the Kingdom into a condition for being amicably settled, Lord Wellington returned to France, and on the 11th of June was again with his army at Bordeaux, giving orders for the evacuation of the city. The troops of the 14th of May he issued his farewell general orders to the army. ('Dispatches,' xii., p. 62.)

In May 1814 he had been created Marquis of Donoro and Duke of Wellington, and the Prince Regent had sent to the House of Commons a message recommending them to grant the Duke such an annuity as would support the high dignity of the title which had been conferred upon him. On the 12th of May an annuity of 10,000l. was granted to him, to be at any time commuted for the sum of 500,000l., which was invested in the purchase of 50,000l. of 6 per cent. annuities. The Duke of Wellington arrived in London, and on the 28th received in his place in the House of Peers the thanks of that House, and on the 1st of July he received likewise the thanks of the House of Commons, through the Speaker.

Peace of 1814.—After the establishment of peace by the treaty of Paris, May 30, 1814, the Duke of Wellington was sent in July as ambassador to the court of France. The Congress of Vienna assembled Nov. 1, 1814, and Lord Castlereagh having returned to England at the beginning of 1815, in order to resume his place in parliament, the Duke of Wellington was appointed to succeed him as the representa- tive of Great Britain. In the month of January 1815 the Duke of Wellington repaired to Vienna to attend the general Congress of the European Powers. In the beginning of March, Napoleon, having escaped from Elba, landed at the head of an army of 20,000 men, at Dunkirk, in order to make preparations for renewing the war in France, without meeting any obstacle, Louis XVIII. having withdrawn to Ghent. On the 13th of March the ministers of the eight Powers assembled at Vienna, including the ministers of the King of France, signed a paper, by which they were to ensure an armistice, and a disturber of the peace of the world, and delivering him over to public justice. ('Dispatches,' xii., 269, 302.) At the same time they declared that they would maintain inviolate the treaty with France, and sent out 60,000 men to occupy the Duchy of Wellington, to which they had appointed to the command of the army to be assembled in the Netherlands.

Campaign of Waterloo, 1815.—In the middle of April the Duke of Wellington repaired to Brussels to prepare for the campaign, and was joined there by the Duke of Baden, who arrived in Flanders, including the Hanoverian Legion, and was joined by the troops of the King of the Netherlands, of the Duke of Brunswick, and of the Prince of Nassau. In all he had had 76,000 men under him, of whom 48,000 were French, and 28,000 Prussians, with their own artillery, and 8,000 cavalry, detached, &c., there remained present in the field about 37,000 British and Hanoverians. The head-quarters were fixed at Brussels. Marshal Bliicher, with the Prussian army, estimated at about 80,000 men, was on the left of the British; his head-quarters were at Mons, in the Netherlands.

During the month of May, Napoleon by great exertions collected an army of about 120,000 men, chiefly composed of veterans, on the frontiers of Flanders; and on the 11th of June he left Paris to take the command. On the 15th the French army was joined by the remnants of the Prussian corps of General Zieten retiring to Fleurus. Marshal Bliicher concentrated his army upon Sombreil, holding the villages of St. Amand and Ligny in front of his position. The Duke of Wellington marched his army from Brussels, and Quatre Bras, on the road from Charleroi to Brussels. Napoleon attacked Bliicher on the 16th, with superior numbers, carried the village of Ligny, and penetrated to the centre of the Prussian position; but the Prussians fought with great gallantry and determination, when Bliicher gave the good order to Wavre. In the mean time the Duke of Wellington, with part of his army, was attacked at Quatre Bras by the 1st and 2nd corps of the French army, commanded by Ney, and a corps of cavalry under Keilermann, which attacked the Prussians of General von Bora. On the 17th the Duke of Wellington made a retrograde movement upon Waterloo, corresponding to that of Marshal Bliicher. He took up a position in front of the village of Waterloo, across the high roads from Charleroi and Nivelles—his right thrown back to a ravine near Montreux, his left extended to a height above the hamlet of Ter la Haye; and he occupied the house and gardens of Hoogvoot, near the Nivelles road, in front of his right centre, and the farm of La Haye Sainte in front of his left centre. The French attacked him at his right, and the Prussians of the 3rd corps, which had been sent to observe the Prussians, on a range of heights in front of the British position.

About ten o'clock on the morning of the 18th of June the French position was occupied by heavy columns of infantry, supported by a numerous cavalry, and by a deadly fire from his nume- rous artillery. His attacks were repulsed with great loss on both sides. In one of these attacks the French carried the post of La Haye Sainte, which was occupied by a detach- ment of the 4th Guards, under the command of Colonel Manteux, who was severely wounded. General Jourdan, whose corps, with his division, were cut to pieces. Napoleon then ordered his cavallery to attack the British infantry, which formed in
squares to receive them, but all the efforts of the French cavalry could make no impression on the British infantry, by whose steady fire they were brought down in great numbers. The French cavalry was nearly destroyed in these attacks, as well as by a charge from Lord E. Somerset's brigade of heavy cavalry, consisting of the Life Guards, the Royal Horse Guards, and the 1st Dragoon Guards, in which the French cuirassiers were completely cut up. At last, by means of a parley and the promise of a complete capitulation, the Prussian corps began to engage upon the French right, Napoleon moved forwards his guard, which he had kept in reserve, to make a last desperate effort on the British left, but, like the army on his left, it was forced back and on the 2nd of July the French began to retire. The British were forced from their position on the heights, and fled in confused masses, leaving all their artillery and baggage on the field of battle. Marshal Blücher now came up with two Prussian corps, and took charge of the pursuit, and though they could not prevent the French from being won at such a fearful cost. The British and German Legion had won on that day 2433 killed, 9586 wounded, and 1876 missing; many of the last however joined afterwards. In the preceding battle of Quatre Bras, on the 16th, they had killed 900 in fight, and 2000 more on the 1st of July, 15,000 killed and wounded, in an army of about 37,000 British and Hanoverians, of whom however about 5000 were not present on the field of Waterloo, being posted near Braine le Comte, or stationed at Brussels, Antwerp, Ostend, and other places. (Official Returns, 'Dispatches,' xlv. 485-87.) More than 600 officers were either killed or wounded at the battle of Waterloo. The gallant General Picton was killed while leading his division to a charge with bayonets. General Sir William Parsons, on a machine gun in the French line, was killed by a party of Polish lancers. Colonel de Lancy, quarter-master-general, was also killed. The Earl of Uxbridge, General Cooke, General Halkett, General Barnes, General Baron Alen, the Prince of Orange, and Lieutenant-Colonel Lord Pitney-Someret, were amongst the wounded. Lieutenant-Colonel the Hon. Sir Alexander Gordon died of his wounds soon after the battle. In the battle of Quatre Bras the Duke of Brunswick Oels was killed, fighting at the head of his corps. Such was the termination of the great conflict, and the end of the terrific warfare of nineteen years from the rupture of the peace of Amiens in 1803.

After the last charge by his guard Napoleon rode off, in the dusk of the evening, from the field of Waterloo, and returned to Paris, which he was soon afterwards obliged to leave. He escaped, except by the short but terrible conflict with the charges of musketry from the British infantry made fearful havoc in their dense mass. They were broken, and gave way down the slope of the hill in irretrievable confusion. On this the Duke of Wellington moved forward his whole army, and the battle on the 2nd of July was conducted in the face of the operations of the Allied Powers.

The Duke of Wellington returned to France on the 28th of August, 1830, to deliver the terms of a treaty between the United Kingdom and the French Republic to the French Government. The treaty was signed at Paris on the 10th of September, 1830, between the United Kingdom and the French Republic, by which the latter agreed to make peace with the former on the terms of the treaty of February 26, 1814, for the restoration of the French Republic, and the evacuation of the French possessions in the United Kingdom, and the other terms of the treaty of February 26, 1814, for the return of the French Republic to its former state of independence and sovereignty. The treaty was ratified by the French Government on the 21st of October, 1830, and the terms were carried into effect by the French Government on the 28th of November, 1830.

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in a full House of Commons by a majority of 44. Though the Duke did not approve of the policy of this measure, some of his friends showed him that such a division would be a dividing line in the cabinet and opposition to a declared resolution of the Commons, he yielded, took up the bill, and passed it through the House of Lords, in spite of the desperate resistance of Lord Granville. The bill, which was introduced by Mr. O'Connell, was negatived by 188 to 140. On the 26th of Mr. a motion made by Mr. O'Connor for leave to bring in a bill for the radical reform of abuses in the state of the Catholic population was negatived by 316 to 13; and a motion by Lord John Russell — "that it is expedient to extend the basis of the representation of the people," was negatived by 315 to 117. There we much distress throughout the country among the agricultural and commercial classes, and the body of the people, at that time, appeared to have little to do with the question of a reform of the House of Commons. A change, however, and that sudden and violent about to take place.

The Duke retired on the 26th of June 1830, and was succeeded by William IV., whose political opinions were believed to be more liberal than those of the deceased king, and whose disposition was known to be more amiable and conciliatory. The British parliament was dissolved by proclamation. The constitution and the grievances which excited the members of the House of Commons.

The new parliament assembled on the 26th of October 1830, and the king's speech was delivered by William IV. on the 2nd of November. The debate which followed Mr. Earl Grey, in the House of Lords, urged the necessity of a immediate reform of the House of Commons; and the Duke of Wellington, in reply, affirmed that "the country therefore possesses a legislature which answered all the good purposes for which it was formed and established, and that it is the full and entire confidence of the country," and declared that he was "not only not prepared to bring forward any measure of reform," but would "not resist any such measure as long as he held any station in the government of the country." After these words Mr. Peel immediately rose in the House of Commons, and, after some very interesting and eloquent speeches, the parliament met on the 14th of June, 1831, to pass the Reform Acts for England, Ireland, and Scotland, and Ireland was passed June 7, July 17, and August 7, 1832. The Duke of Wellington opposed the Reform Bills steadily, and sp鬓ately in opposition he became more and more unpopular, and the bitterness of the feeling—at least of the lower orders—may be inferred from the fact, that when returned from a visit to the Tower, June 16, 1832, he was booted and roughly treated by the mob, and would scarcely have escaped with his life had not some gentlemen and soldiers had not placed themselves near his horse, and escorted him. The windows of Apsley House were also broken, and he afterwards protected them by casements.

The office of Chancellor of the University of Oxford became vacant by the death of Lord Grenville, January 1, 1834, and on the 29th of the same month the Duke of Wellington was unanimously elected to succeed him. The ceremony of installation took place on the 9th of June in the presence of the Queen and the Duke of Cambridge.

On the 8th of December 1834 Sir Robert Peel was gazetted as First Lord of the Treasury, and the Duke of Wellington as Secretary of State for Foreign Affairs. This first Reform Act, that of the 29th of March 1832, Lord Grey, who had succeeded Earl Grey as prime minister, assumed the permanent office. William IV., having died on the 25th of June 1837, was succeeded by Queen Victoria, and Le...
Melbourne retained the office of premier till August 30, 1841, when he resigned, and Sir Robert Peel again became prime minister. The Duke of Wellington retorted, however, and under the premiership of Sir Robert Peel resigned office. The Queen then sent for Lord John Russell, but he was unable to form a ministry, and Sir Robert Peel was recalled. The Duke then saw the necessity of the repeal. He put aside his own opinion, stood by his word at Barnstaple, and returned to the Queen and the Commons, and by his influence and his proxies passed the measure through the House of Lords, May 28, 1846, by a majority of 47.

The Duke of Wellington died Sept. 14, 1852, at Walmer Castle, aged 83, as if he had fallen asleep in his chair, after a slight illness in the morning. He was buried in St. Paul's Cathedral, London, under the dome, and beside him remains Lord Nelson. The funeral was public, and the Duke of Wellington had died of natural causes in 1836; and during the procession to the cathedral, Nov. 9, the sympathy of all classes of the people for the loss of the greatest of Britain's military commanders was as strongly manifested as it had been at the funeral of her greatest naval commander in 1837, which was in three Scandinavian countries. It was regarded however as a great triumph of Wellington's views that, in 1837, Sweden conceded the point of allowing a separate national flag to Sweden. It was a result of an interview on Cornwallis between Wellington by his eldest son Arthur, Marquis of Donoughmore, who was born in 1807. The Duchess of Wellington died in 1831.

The leading characteristic of the Duke of Wellington's mind seems to have been sound good sense, based on patient examination into details, and a careful study of the whole in order to arrive at a right conclusion. He made allowance for contingencies, passions, interests, estimated things at their real value, and was rarely wrong. His great principle in his public life was a steady, unswerving, indomitable stimulus of glory or ambition. His manner was in general singularly calm. He never seemed to be elated by success, nor depressed by discouragements or difficulties. Quickness of decision and energy of execution marked his character during the whole of his life. He was not inflexible however in carrying out his plans as a commander or his views as a statesman; but altered his course when new information or a change of circumstances offered a sufficient reason for a change of determination. He was regular in his attendance and punctuality of life, and in his mirth and his cheerfulness. He was a good conversationalist; and at his places in the use of food and wine, slept on a hair-mattress on a simple camp-bedstead, was an early riser, and was indefatigably in his attention to business. He seldom made use of a carriage, and continued to ride on horseback when the froms became of such a height that he could no longer sit erect, and he also used the exercise of walking even to the last, through his steps were slow and altering.

WEGELEND, HENRIK ARNOLD, a very distinguished Norwegian poet and political writer was born on the 17th of June 1806 at Christiana, where his father, Nikolai Wegeland, a clergyman, was one of the assistant masters at the Latin school. The father, who was much expected, and who survived the son, was one of the deputies to the first and second national assemblies in 1814; and the father, who was a pioneer in the movement for union with Denmark and united to Sweden, and met and formed the constitution of Eidsvold, the acceptance of which by Sweden laid the foundation of a new and much more prosperous and glorious period in the annals of Norway. He was afterwards appointed priest of the parish of Eidsvold, the place from which the constitution takes its name, which is at the distance of about 40 English miles from Christiana; and it was there and at Christiana, first at the cathedral school and afterwards in the university, that he received his education. It was in 1826 at Eidsvold that Henrik Wegeland commenced his literary career under the assumed name of Sufi Sifafda, by a farce or dramatic satire entitled 'Ah.' It was afterwards followed by twelve other farces of a similar kind, some in verse and some in prose, and mostly

an Aristophanic vein, with a political bearing and a seasoning of ribaldry and satire. It is not surprising therefore that these productions should arouse the animosity of the parties to whom they referred, and for the ten years from 1827 to 1837 Wegeland's life was passed in what is familiarly called 'turbulent water.' But his was not the fate of all. Some of his works in prose, some of which he occasionally edited, were not very frequent; and his poems, many of which were on political subjects, were hardly less numerous. His admirers were at this time fond of calling him the 'Byron of Norway'; but his 'R. G. Laslett, who knew him, says that he was better regarded in Norway, and so narrow as to be antagonistic even to the other members of the Scandinavian family, the Danes and Swedes. For some time he drew the whole youth of Norway with him, but in 1838 the appearance of an attack upon his best work and even another run of post and press by the 'Henrik Wegelands Digteksent og Folkemik' (Henry Wegeland's Poetry and Polemics)—began to turn the current, though Wegeland's father wrote vigorously in his defence, and at present it may be considered that the public regard for his work is passing away from him. His success, however, has been very great in the kingdoms of Sweden and Norway, and his admirers have been very numerous in all three Scandinavian countries. It was regarded however as a great triumph of Wegeland's views that, in 1837, Sweden conceded the point of allowing a separate national flag to Sweden. It was a result of an interview on Cornwallis between Wellington by his eldest son Arthur, Marquis of Donoughmore, who was born in 1807. The Duchess of Wellington died in 1831.

A collected edition of the principal works of Wegeland was commenced in 1851 by the Student's Society of Christiania, under the editorship of H. Lassen. The last volume we have seen of it is the eighth, published in 1856, and it was to be completed in nine. The editor, who had the task of collecting many of these writings from magazines, reviews, and newspapers, had this task been not always easy, for on some occasions it was necessary to render them intelligible to those not intimately acquainted with the passing history of Norway at the time during which they appeared. Three volumes of the eight are occupied with poetry, among which is Jan Van Huygen's Flower-Pieces, and the Fourth Stuarts are considered by far the best. One volume is filled with farces; two others with dramatic poems. An early tragedy, entitled 'Sinclair's Death,' is founded on a well-known incident in the annals of Norway; the story of the Sortland mercenaries in Sweden by a treacherous attack of the Norwegian peasantry. An opera entitled 'The Campbellers,' and two tragedies, 'The Child-Murderers' and
The Venetians,' are of particular merit. 'Creation, Man, and the Messiah,' is given in a revised and corrected shape, as left by the author. Of Weergeland's prose writings the most interesting are a volume of short biographies of distinguished persons, and a history of the constitution of Paisley.

WERNERITE. [SOAPOLITE.]

WESTALL, WILLIAM, A.R.A., younger brother of Bowen, was born at Hertford on October 13, 1781. He studied at first under his brother, and subsequently at the Royal Academy. Here however his studies were interrupted, by his appointment, in 1801, on the recommendation of the President, West, to accompany Captain Flinders in the "South-Wind" on his important mission to the southern seas. Westall was with Flinders for two years, when, the Investigator having been abandoned, he was transferred to the companion ship, the Porpoise, in which he was wrecked on a coral reef on the north coast of Australia on his voyage home. Thus he, who had been on a voyage of discovery and had seen the coast and the interior of Australia. Of these he exhibited at the Royal Academy, in 1812, his views of 'Port Bowen,' and 'Seaford's Isle in the Gulf of Carpentaria;' and the striking character of the scenery, and the rich and novel herbage, which he had himself collected, and prepared them very attractive. They secured his election as Associate of the Royal Academy in the same year: he had for some time previously been a member of the Society of Painters in Water-Colours. Unfortunately perhaps for his reputation, he did not stay at Sydney, and he had thus opened. He turned his attention to making drawings for engraving, in which he for many years found ample and profitable employment, but he thus contracted a neatness and prettiness of style which proved destructive of all grandeur of effect when furnishing in his paintings. Among his best known series of engraved designs are his views of the lakes of Westmoreland and Cumberland, which are drawn with great fidelity, though with some deficiency of power: he was a frequent visitor to this district, and the enjoyment of it by Sir Walter Scott, has been a theme for Wordsworth, by both of whom he was greatly esteemed. He also drew and engraved in aquatint a series of views of the Caves, and of the Abbeys and other Monastic Ruins of Yorkshire, of the Isle of Wight, Oxford, Cambridge, the Rock of Cashel, and Poets' Corner at Westminster. Of his collection of oil paintings to the exhibitions of the Royal Academy were comparatively few, and in his later years they became fewer than they might else have been, from finding himself in reality excluded from the full honours of that institution. Mr. Westall met with a severe accident, in 1847, by which his left arm was broken, and he received some internal injuries, from the effects of which he never wholly recovered. He died January 29, 1850.

WESTERN AUSTRALIA, in its widest sense, extends over that portion of the continent lying west of the 123° E. long., the boundary west of South Australia and North Australia; so that the boundary-line between it and the other parts of the continent joins the Indian Ocean east of Cambridge Gulf, and separates it from the Great Australian Desert. Thus Western Australia contains about one-fourth of the whole continent, and lies between 30° and 14° S. lat., 115° and 123° E. long. The limits of the British colony, originally established under the name of Swan River Settlement, are much less, but the boundary has not been definitely settled, and is constantly being extended. It may be said to lie between 30° and 35° S. lat., 110° and 119° E. long., or about 400 miles from south to north, and about 260 miles in breadth. Geology.—The coast-line presents a much greater variety than most other parts of Australia. In some parts the sea to some distance from the shore is covered with numerous islands, islets, and rocks, which render these countries difficult of access. From this cause an extent of coast-line, about 600 miles in length, has not been visited. Thus there is a coast distance of nearly 3500 miles, so that our information in respect of the natural products of the country is very limited. Within the confines of the colony there are numerous estuaries, each of which receives several rivers. Of the few good harbours along this coast is Broome Rockingham in Cockburn Sound, Albany in King George's Sound, Bunbury in Port Lechenhaut, and Augusta, near Cape Leeuwin, on the southern side of the south-western promontory of the island. At the mouth of the Swan River, and at the head of the Melville Water, which runs inland near the north-west coast, is the capital of Western Australia. The entrance is encumbered and rendered dangerous by several rocks. A lighthouse is placed on Rottnest Island at the entrance, and on some of the more dangerous rocks there are beacons.

MOUNTAIN SYSTEM.—The Darling Mountains extend along nearly the whole length of the colony. Its distance from the coast varies from 50 to 150 miles, and its height is from 800 to 3000 feet. It is generally sterile; the granite appears in some places in masses of unbroken rock, and plane the surface resembles the English heath grow in considerable numbers. There are forests of large mahogany and blue gum-trees. In the Darling Mountains have been found roofing-slate, lime-stone, marl, and some granite. The rock is composed of an aggregate of iron-ore, chamois of lead, galena, and copper. Wide valleys bordered by fertile plains occur where basaltic rocks are developed. Columnar basalt is found around Geographe bay, and from thence to Shark Bay a band of coal has been traced a distance of 60 miles west of the colony.

In that part of Western Australia which borders on the south coast, there are three distinct parallel ranges of mountains running from north to south. The highest and most eastern of these has its southern termination near King George Sound, at Cape Naturaliste, 30° S. lat.; and Cape Chatham, 32° S. lat.; Cape Leeuwin, in about 34° 20' S. lat., is the southern termination of the third range, which is inferior in altitude, as well as in extent, to the other two: it terminates on the north at Cape Naturaliste, 30° 27' S. lat. The highest point of Western Australia is Mount Wellington, which is situated on an elevation of 5000 feet. On the mountains and higher hills the surface is rugged and stony; on the lower sides of both the soil is excellent; but in the principal valleys and the lower grounds, where the sandstone formation prevails, it is of a very poor quality: the box-tree, or acacia, is the principal tree, the trunk of which is 20 feet in diameter, and the height 100 feet. The Swan River rises on the western side of the Darling Range. At its mouth is a bar, after passing which the river is navigable, though with difficulty, for some distance. The other rivers are the Avon, the Murray, the Cann, the Harvey, the Preston, the Collie, the Vasse, the Margaret, and the Murray. The Darling River is chiefly navigable for only 2 miles: the Swan rises in the Darling Range: it is smaller than the Swan, and only navigable for a few miles. Shoals impede the navigation, and in dry weather boats must be pushed over them for fully half a mile. The Murray takes its rise also in the Darling Range. At its mouth, which is situated at an elevation of 6000 feet, the river is very shallow.

For the botany and zoology of Western Australia, see Australia.

Climate.—The climate of Western Australia has the same general character as that of Eastern Australia. [AUSTRALIA.] It has not generally been found prejudicial to Europeans, but in the case of some persons it has caused them to feel the disadvantages. Though variable, the western part of this colony...
It has a jail, and some trade in timber. Augusta is a small port on the eastern side of Cape Leeuwin, on the estuary of the Blackwood River. Bunbury is the port town of a district formerly called Australind, of which a small village by that name is the nucleus; and to which, upon which it stands, is a good and large one, but it has little commerce. Geraldton is an inland town on the Murchison River, founded in consequence of the commencement of the working of lead-mines there by a company. Guildford is a town of considerable importance, of which more is said anon. Northam is a small inland town, in an agricultural district, east of the Darling Range, on the river Mortlock, and is about 60 miles in a direct line E.N.E. from Perth. Rockingham is on Cockburn Sound, and has a good port, and some emigration. The port of Fremantle, about 50 miles from Northam, and about 50 miles N.E. from Perth, upon the river Toodyay, which pierces the Darling Range, and falls into the Melville Water, but is not navigable. Vasse is a small port on Vasse Inlet, in the centre of Geographe Bay, and where, about 90 miles S. from Vasse, across a fine country, forming the promontory bounded by Cape Leeuwin and Cape Naturaliste. Other small towns of little importance are named York, Picton, Carnarvon, &c.

WESTMACOTT, SIR RICHARD, R.A., was born in London in 1775. His father was a sculptor of some eminence in his day, and in his studio (Mount-street, Grosvenor-square), the young Westmacott learned the use of the chisel. On the 1st of March, 1793 he was admitted into the Royal Academy, and received instruction from Canova. His career as a student in Italy was a distinguished one. He carried off the first prize in sculpture at the Academy of Florence, in 1794; and in 1796 the medal given by the pope. He was elected a Member of the Royal Academy of Fine Arts of Paris, in 1797. But what prolonged stay in Italy, he returned to London, and was soon recognised as one of the best of the young sculptors of the day; and his future career was on the whole a very prosperous one. His imaginative works were of an exceedingly graceful and poetic tendency, and in execution resembling that of the modern Italian school; several of these will retain their place among the best poetic works of the English school of sculpture. The most popular is his veined plaster of 'Psyche,' exe- cuted for the Duke of Bedford, and now, with other marbles, 'Cupid,' at Woburn. Among the best known of his other poetic works are the 'Euphrasion,' executed for the Duke of Newcastle; an exquisite figure of 'A Nymph unclasping her Zone,' the property of the Earl of Carlisle; 'The Distressed Mother,' executed for the Marquis of Lansdowne; 'The Homeless Wanderer;' 'Devotion,' &c. He also exe- cuted several important works in altar and bas-relief; one of the first of which was probably his portion of the frieze of the mosque on the Mausoleum of the Sultan of Odessa. Several of other portions being Flaxman and Baily. His latest work in this style was the pediment of the British Museum. He also executed for the late Earl of Egremont, a large altar-relievo in marble of the 'Death of Horace' for the gallery at Petworth. A large part of his time was however occupied, and much of his reputation now rests, on public monumental statues. Of these it will suffice to mention his statues of Pitt, Fox, Spencer Perceval, and Addison (1800), which, with his monuments of the Duke de Montespennes, of Mrs. Warren, and her Child, the Duchess of Westminster's Abbey, and Sir Ralph Abercromby, Lord Collingwood, and Generals Pakenham and Gibbs, in St. Paul's Cathedral; Lord Erskine in the Old Hall of Lincoln's Inn; Fox in Bloomsbury- square; Florence Nightingale in St. Thomas's Hospital, and the Duke of York on the column at Waterloo-place. The so-called 'Achilles,' copied from the statue at Monte Cavallo, Rome, and inscribed by the Women of England to the Duke of Wellington, was modelled by Westmacott, but whether he had any hand in it to be decided. It is manifestly his taste, or that of the women of England, we do not know.

Westmacott was elected A.R.A. in 1806, and R.A. in 1816. In 1837 he succeeded Flaxman as Professor of Sculpture at the Royal Academy, which office he held till his death. He was a man of extensive reading and sound judg- ment, and his lectures were marked by these qualities, and by the absence of pretension. Shortly after her accession to the throne, her Majesty conferred on him the honour of knighthood. He died on the 1st of September, 1856.
and writer on international law, was born at Providence, Rhode Island, U.S., in November 1785. Having completed his education at Brown University in his native city, he graduated there in 1802; studied law under Mr. N. Sere, and was admitted to the bar. He then passed a couple of years in Paris and London, during which he acquired considerable acquaintance with the French language, and rendered himself a complete master of the French language. On his return to America he settled in New York; commenced practice in his profession, and in 1812 became editor of the 'National Advocate,' which journal he continued to conduct for about three years. He contributed to it, among other things, a series of disquisitions on the law of nations. In 1816 he was appointed one of the justices of the Marine Court, and the same year he published a 'Digest of the Laws of England, as affected by the war with France.' The work was received by the profession with much favour. He was about this time appointed reporter to the Supreme Court of the United States, an office he held for twelve years; his 'Reports of Cases Argued and Determined in the Supreme Court of the United States during the Tenure of the Hon. William Cushing, Judge of the said Court,' was published in 1818. This work was taken as a model by the judges of the courts of the United States, and has been continued to the present time.

WIDIN, a fortified town in Turkey, capital of Upper Bulgaria, is situated on the right bank of the Danube, opposite the straggling village of Calafat on the left bank, about 130 miles E.S.E. from Belgrade, and has a population of about 3000. The town is of great antiquity; it was founded by the Turks in 1853-54. The town contains pretty wide streets for a Turkish town; many mosques surmounted with graceful minarets; small bazaars, &c. It is the residence of the Austrian Danube steamer company. The trade of the town is in rock-salt, corn, wine, and agricultural produce. The Austrian Danube steamer company put into Widin. The inhabitants of Widin consist of Turks, Greeks, and Armenians; the Christians inhabit suburbs outside the walls of the town.

WIFE AND HUSBAND. The chief alterations in the laws affecting the relation of husband and wife have been already stated, but may be shortly summed up in this place. A wife was deserted by her husband may obtain an order for a separation on the ground of cruel or inhuman treatment, or she might be then be able to contract as if she were a femme sole (20 & 21 Vict. c. 85, s. 81). When the desertion of the husband extends over a period of two years, or when he treats her with cruelty, or commits adultery, the wife may obtain a divorce, of which he may not obtain a re-admission, but which commits incestuous adultery, or to adultery adds the crimes of bigamy or rape, cruelty or desertion for two years, or is guilty besides the adultery of an unnatural offence, the wife may obtain her freedom by paying the damages, and cannot apply for a divorce. This Act 20 & 21 Vict. c. 85, which has effectuated these alterations in the law, makes various other provisions, for which however the statute itself must be referred to.

WIFFEN, JEREMIAH HOLME, was born in the neighbourhood of Wick, in 1792, of Quaker parents, and was educated for the profession of a schoolmaster, a vocation which he followed for several years. He very early however displayed a taste for poetry and literary composition. In 1813 he published a 'Geographical Primer,' and in the same year, through his own exertions, he published a small and learned work on the role of the Scandinavian history and literature, the result of which he published in London in 1815. He was afterwards, in 1817, appointed Professor of Scandinavian History in the University of Jena, and continued in the same capacity until his death.
though with pardonable partiality. He lasterly studied Hebrew and Welsh, from the last-named of which he made several successful poetical translations. Mr. Willemin entered his connection with the Society of Friends, holding offices of trust in it occasionally, until his death, which took place suddenly on May 9, 1866, at Woburn Abbey.

WILL AND TESTAMENT. The 'Wills Act,' 1 Vict. c. 36, has been amended by the Statute 16 & 17 Vict. c. 34. Since the last-named measure an immense number of questions had arisen upon the language of its provisions; and probate had over and over again been refused to wills, the authenticity of which was beyond all question, on the ground that the words used by the testator were not the words, or were not a specimen of legislation; as the simple perusal of it will show, that it is not passed to amend the law, but to provide against the consequences which have been held to follow from the negligence of testators, in not paying strict attention to that very element of the Wills Act, which requires the instrument to be signed at the "foot or end."

WILLEMS, J.AN FRANS, the originator of what is called "the Flemish movement" for the revival of the cultivation of the Dutch language in Belgium, was born at Bonchoot, a village near Antwerp, on the 11th of March, 1793. The French sans-culotte army, under Dumouriez, was at that very time advancing to the siege of Antwerp; a party of his soldiers entered Bonchoot on the night that Willems was born, and on hearing the state of affairs politely withdrew from the town. He was the first child born in the city, and little foreseeing how effective an opponent he would prove to the influence of France in Flanders. The attachment of Willems to the Flanders language, and his whole life, has been described by Lierre, where he had resided from the age of twelve to fifteen, then the young Willems sang and playing on the organ, and where he was fortunate enough to meet with a protector and educator in the person of Mr. Bergmann, who, in the then cessation of public means of instruction, was the only leader in his own family, and allowed young Willems to share their instructions in Latin and literature. Lierre was still in possession of some of the 'Rédéryk-Kammers,' or Chambers of Rhetoric, the existence of which was one of the most famous literary features of olden Belgium. He was enabled by this to get up theatrical entertainments. "The Cecilian Society of the principal church, St. Gummar's, where I every day sang or played the organ, being," says Willems, in a history which he afterwards wrote of the Chambers of Lierre, "in the mind to act some pieces for the benefit of the church, this was the occasion of first bringing me on the stage, and I represented the angel Gabriel bringing the announcement to the Virgin Mary, in the piece entitled 'The Nativity and Youth of Jesus Christ.' I remember that our manager, Mr. Van den Bussche, a retired publican, came to me every evening before the curtain rose made us kneel down on the stage, and read the Litany of Our Lady that the performance might go off well. It was strange to see how all the multitudes that came to see the spectacle, the King, St. Joseph and our Lady (N.B., our Lady with a beard), Herod, the three kings, the Jewish Scribes and Pharisees, the angels and the devils all joined in the responses, 'Pray for us, pray for us.' I shall never forget it." The mysteries of the middle ages were then as yet not seen, flourishing in the 19th century in Belgium, as well as in some more remote corners of Europe.

When Willems was a boy of fourteen at Lierre he wrote a poetical satire in Flemish on the authorities of Bouchout, which he entertained, or rather got his father to entertain, as a tax-collector. This and some other proofs of talent led his patron Bergmann to advise his parents not to bury him in the obscurity of his native village but send him to Antwerp, where he was placed as clerk to a notary, and, in 1816, commissioned with the duty of getting up theatrical performances of the prize that was offered for the best poem on the battle of Friedland and the peace of Tilsit. An amateur theatre was his favourite recreation, and two plays of his composition, 'The Rich Antwerper and the Quaint Merchant,' met with success both on the stage and elsewhere. The union of Belgium with Holland, which followed the overthrow of the French dominion in both countries in 1814, naturally directed attention to the fact that the so-called Flemish language had been twice levelled by the French, and was steadily rising again. Willems, who was no writer in his own language, and who was always ready to lend a hand with the cultivation of the Flemish language, which was at one time more cultivated in Flanders and at another in Holland. Willems took the lead in reviving and making permanent what it is very singular should ever have been overlooked or forgotten. A spirited poem by him—'Aen de Belgien!' (To the Belgians)—published in 1816, exerted his countrymen not to continue to abandon the language of their fathers, which was also the language of Vondel and Bilderdyk. This poem, which produced a strong sensation, was accompanied by a French translation, which it may be remarked was not a very faithful one. It excited the attention of the Royal Academy of Language and Literature in connection with the Southern Provinces of the Netherlands.' (Verhandeling over de Nederlandsche Tael- en Letterkunde opgetekent by de Zedegelyke Provincien der Nederlanden), which was commenced in 1819 and completed in 1836, in four large folio volumes, aimed at tracing the literary history of Flanders and Brabant from the 13th to the 19th century, showing that literature had flourished in those countries as long as the language, and that it had declined since the religious wars which led to the separation of the North and the South Netherlands, because from that period Latin, and particularly French, had been looked upon as the only instruments of literary cultivation in the Catholic Netherlands, while the use of the native dialect, or of one nearly akin to it, had been abandoned to the Protestants of the Seven United Provinces. There was an outcry against the author of this work on two accounts, one from the antagonists of the union of Belgium with Holland, who deprecated the views of Willems, and another from his views tended to recommend the government measure of the introduction of Dutch as the official language, the other from zealous Catholics, who were indignant that a Catholic should maintain the superiority of the literature of the Protestant portions of his country. Willems then, in his last-named works, had great value at the time of its appearance as the only attempt at a connected history of Flemish literature, but the additional light since thrown on the subject by the researches of Willems himself and of several others has had the effect of rendering In the degree of interest of its publication Willems was looked upon as the champion of the Flemish cause, which he defended against all enemies and in particular against Van de Weyer, a French pamphleteer, who published a Flemish dictionary in 1829, only a year before the violent secession of Belgium and Holland.

The revolution of 1830 appeared at first sight to be a mortal blow to the prospects of the Flemish language, and also to the future of its patron Willems, who was then placed by the Dutch government in the advantageous post of a receiver of some public dues at Antwerp, where he had been previously appointed by the city as an assistant keeper of archives. He had also been, in conjunction with Van de Weyer, one of the founders of the Flemish monasteries of the South Netherlands. Of these posts he was deprived by the provisional government of Belgium, and sent in an obscure position, with a reduced salary, to the small town of Eecloo, where, declining the offers of the Dutch government to place him in a more advantageous position in Holland, he remained for four years. By that time the indignant remonstrances of some of the chief literary men of Belgium, and in particular of his old opponent Van de Weyer, aroused the government to a sense of his unworthy treatment, and in 1836 he was placed at Ghent in a situation similar to that he had occupied at Antwerp. While at Eecloo he had published a modern Flemish version of the celebrated medieval poem of 'Reynard the Fox,' which he had translated from the old Flemish manuscript, and which was a success in London. This, together with the hope of an old Flemish manuscript of the poem at London, in the auction of Richard Heber's library, he applied to the Belgian government to secure it for Belgium; it was purchased at his recommendation for 1865, and in 1856 the poem was printed under his supervision. To his enterprise and perseverance is due the preservation of so much interesting matter. The cultivation of the Flemish language, which he had first promoted, went on increasing. In 1841 a Flemish festival was held at the University of Ghent;
two years later a meeting of the 'Taelverbond,' or 'Language Association,' at Brussels, at which Willems officiated as president. The movement was too powerful to be withstood by the government. Willems had no longer to fear disgrace for his exertions, and had already, in 1838, been named a knight of the order of Leopold. The Flemish movement still appears to mark progress, and the meetings which have been held of distinguished literary men of both the North and South Netherlands appear likely to result in placing the Flemish in a position of esteem and recognition which it has never enjoyed for centuries. Willems however was not destined to witness this triumph. He died at Ghent on the 29th of June 1846, after a very brief illness, of an apoplectic attack.

His works, according to the list given in the 'Belgisch Museum,' are 43 in number, 35 in Flemish, 5 in French, and the remainder in both languages. The most important which have not been already mentioned are his 'Mengellingen van een inheem cin' (Miscellaneous on National Subjects), Awtwerp, 1875-76; the 'Rymed Chronicle of Jan van Heeuf,' and the 'Rymed Chronicle of Brabant, by Jan de Klerk,' edited for the Belgian Historical Commission; and the 'Chronicle of Edward the Third, king of England, written in the Congress in Jan de Klerk,' and first published by Willems at Ghent in 1840.

WILLIAM II. (FREDERICK GEORGE LOUIE), King of the Netherlands and Grand Duke of Luxembourg, was born on December 6, 1782, and under the care of his father, Prince Leopold, the infant was completing his education in the university of Oxford, where he showed much talent. He entered the military service early, serving his first campaign with the English army in Spain, and in 1811 accepted the rank of lieutenant-colonel in the Spanish army. His early achievements and success gained him the esteem of the Duke of Wellington, who made him his aide-de-camp. At the siege of Ciudad Rodrigo he was among the foremost in the storming party, and at that of Badajoz he exhibited qualities of courage and determination which attracted his father's attention. In 1815 he commanded the army of the Netherlands, and displayed bravery and military skill in the battle of Quatre Bras, and in that of Waterloo, at which he headed his troops, and was wounded in the shoulder. On his recovery he was recalled to the command of the army of Holland in the short war against Belgium, in which he was at first victorious, but was at length compelled to retreat by the armed intervention of France. He was then appointed to the command of the army of observation on the Belgian frontier. On the resignation of his father in 1840, he resumed the government, in which he showed great regard to economy, and a desire to promote financial improvements, but opposed all constitutional reforms. On the breaking out of the revolutionary storm, which spread so widely throughout Europe in 1848, he preserved the loyalty of the government, probably might have been avoided by smaller concessions made earlier. He did not however live to witness the effect of the alterations, as he died on March 17, 1849.

WILLIAM, SIR, a skillful designer and engraver on wood, was born at Colchester, Essex, on the 23rd of February 1788. The son of parents in humble circumstances, his early desire to become an artist met with little encouragement; but he taught himself to paint, and in his native town. While serving his apprenticeship however

he taught himself etching, and subsequently wood-engraving. So attached had he become to the latter art, that on the expiration of his term of service he determined to adopt it as his calling, and, possessing some skill in design, he found ready access to the London publishers of low-priced works. His earliest works include: a series of 300 plates was given into the hands of the then untried country artist. Gradually increasing his number of clients, and being perhaps the most original among the best designers and wood-engravers of his time. His earlier engravings executed for Whittingham's Novelties and Poets, for Willem's 'Tasso,' and the architectural publications of Mr. J. Britton, displayed great freedom and ability in the treatment of their subjects. He afterwards appeared in the capacity of a designer, and original, though occasionally somewhat rude designs were made for Hone's 'Every Day Book.' In his later engravings and designs as those in 'Howitt's Rural Life,' 'Scrope's Days of Salomon-Taylor and Beer Staking,' 'Bathg Examined,' 'Seasons,' &c., he shows much more elaboration and neatness, with an equal evidence of the devoted study of rural life and scenery, but perhaps some loss of power. Through out life he retained his early ambition of painting in oil, but was not successful. He graduated B.A. in 1807, works of 610 kilos in that branch of art. He died on the 19th of September 1853. Two of his sons still sustain the reputation of the name of Williams as wood-engravers.

WILSON, PROFESSOR JOHN, was born on the 19th of March 1766, and was educated at the University of Edinburgh. His father was a wealthy manufacturer. He was the eldest son: one of his brothers, James, became distinguished as a naturalist; one of his sisters became Mrs. Ferrier, and the mother of Professor Ferrier of St. Andrews; and another of his sisters married Sir James Watt, the inventor. A pupil and essayist was sent to a school at Glenorchy in the Highlands kept by the Rev. Dr. Joseph McIntyre; and here he acquired his first enthusiasm for Highland scenery and his love of open exercise, and at the age of thirteen he went to the University of Glasgow, whence, after five years of study, he removed in 1803 to Magdalen College, Oxford. At Oxford he was distinguished no less for his literary genius and attainments—as shown in his carrying on, among other honours, the biographical prize in 1806 for a poem on 'The History of the Decline and Fall of the Roman Empire.' From the age of nineteen he was on the study of Greek and Roman Architecture,—than for the exuberance of his animal spirits, his great physical strength and beauty, and his fondness for athletic sports. He was the best boxer, leaper, and runner about the University. He graduated B.A. in 1807, and in 1814, with the degree of M.A. "A fair-haired Hercules- Apollo," says a writer, sketching his life at this time, "and with plenty of money enabling him to gratify his tastes whatever they might be, he had scarcely left Oxford, when he signified his intention of engaging in the wars of the First Consul, which he did by his father, the small, but beautiful estate of Eilean on Lake Windermere, where as Hercules, he might yacht about at his pleasure, heat the best boatman at the oar, and wrestle with the smartest blacksmith. What the Hercules of Greece might do in the quiet beauties of the finest of English lakes, he might revel in, indisput undisturbed in poetic dreams of his own, and cultivate with due reverence the society of Wordsworth." Here, besides Wordsworth, he became acquainted with Coleridge, Southey and De Quincey, the last of whom describes the extraordinary manliness of his character at this time, dashed with an eccentricity which showed itself in all kinds of freaks and projects—and among them that of becoming a traveller in Africa. It was at this time (1810) that he entered the service of Sir Henry Clinton, who had been sent out to the Mediterranean, and who was a visit to the Lakes with her family, and, falling in love with her at first sight, wood and won with romantic rapidity. He had by this time published some anonymous works, written in Coleridge's 'Friend,' and elsewhere; and in 1811 he published his first essay in poetry, which piece, dedicated to the Memory of the Rev. James Grahame,—i.e. the poet Grahame, the author of 'The Sabbath.' Though his summer head-quarters were at Eilean, Wilson spent part of every year in making a tour, and during one of these tours a letter from a letter to Miss Joanna Baillie will show the impression which he had begun to make in Edinburgh: "The author of the Elegy upon poor Grahame is John Wilson, a young man of very considerable poetical powers. He is now engaged on a poem, which promises to bring him into prominent notice."
burgh, where he now is. ... He seems an excellent, warm-hearted, and enthusiastic young man; something too much perhaps of the latter quality places him among the list of originals." The 'Isle of Palms' here alluded to, was published in 1812, and gave Wilson a place among the Lake Poets, the 'Poets of Passion'; but this is no admired, however he never practised; and from that time forward Edinburgh was his accustomed place of residence. He wrote for the 'Edinburgh Review' a criticism on the 4th canto of Childe Harold—his only contribution to that periodical. 'On the Enchanted Isle' is a poem of some length, on 'The City of the Plague'; his magnificent physique was the admiration of Edinburgh, so that, as he walked hurriedly along Princes-street in somewhat wild costume, and with his fair hair streaming from under his broad white hat, he was the centre of all the circles that was that of a young Goth of geniuses with Powers undeveloped, which would one day astonish Britain.' At first Wilson was associated with Lockhart and others in writing for the 'Quarterly Review,' and that is what led him to the conclusion that publication was identified with him to that full extent.

The connection with Blackwood was an important event in the life of Wilson; and it was speedily followed (1820) by another important step in his political and literary career. Hamilton, afterwards Wilson's colleague, was a defeated candidate on the occasion. Scott, who used all his influence in behalf of Wilson, wrote to Lockhart expressing his hope that if he obtained the appointment, it would give him "the confidence and steadiness of character" which are all he wants to make him the first man of the age." The appointment, together with his connection with Blackwood (both of which came at a time when some pecuniary reverses had checked his career and driven him into the life at which he had, at all events, the effect of determining Wilson's genius permanently to prove rather than to veer. He still, indeed, wrote verse in the Lakist style in quantity sufficient, when added to what he had already written, to make two octavo volumes. His son, Sir Thomas Wilson, in 1831, in a poem of some length, called 'The Trials of Margaret Lyndsay.' He wrote also political articles on the questions of the day, in which he blazed out as a Tory in a manner heartily satisfying to his instincts, and yet as a liberal in his powers of eloquent desultory and detached criticism, in which he advanced and expanded canons of taste, especially in poetry, deeper than those of Jeffrey, and vindicated against that critic and his disciples the poetic claims of Wordsworth and the writers associated with him. He wrote, either as lectures or as articles, subtle philo-
sophical disquisitions, not very connected or systematic perhaps, but gleaming with brilliant ideas, and tinged throughout with that rich and highly-coloured mode of metaphor which Coleridge was diffusing through England. Lastly, careless of the formality conventionally identi-
tified with the gown of a Scotch professor, and that the gown of a professor of moral philosophy, he wrote papers for the magazine in which he was seen relapsing ideally into his character as an untrammeled human being, a bruiser at country-fairs, a sportsman on Scottish hills and rivers, a boon companion with Highlanders, a knight of free manners, on life and literature, from the point of view of an inspired king of the gypsies or from amid the upraisings conditions of a city orgy." Among these papers of riddles phantastical, the most famous were the series called the 'Noces Ambrosienses,' of which the first and second were published in 1825, as well as Wilson, was a contributor to Blackwood, but which, taken up in 1826 by Wilson for himself, after Lock-

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thart's departure for London, were continued by him till 1836, when the death of the Etrick Shepherd, their principal correspondent, put a temporary stop to the publication of these 'Noces' that carried the name of 'Christopher North' over the world as the pseudonym of Wilson. They were followed by a series called 'Diss Boreales,' which extended from 1836 to 1846, but were less popular.

After the death of his wife, which took place about 1840 and left a profound sorrow in his heart, Wilson was much less active than he had till then been. He still figured as Christopher North in stray papers in 'Blackwood'; in 1842 he had published separately under that title 'Recreations of a Cynical Philosopher.' He died at Edinburgh, 1844, of paralysis, after a long illness. A volume of 'Noces Ambrosienses' was published posthumously in 1845, with a memoir by Sir Thomas Wilson, in which he is said to have written his most important contributions to the magazine; and still as 'The Professor' he was one of the lions of Edinburgh society and the idol of successive classes of students to whom he lectured his moral philosophy from the heads of a word onwards. He was, in 1824, at the height of his powers and reputation, and a man of great reach at the end of every eloquent period; but on the whole, the best of his career was over. Letterly, too, ill-health reduced his once abundant vigour. He continued in the discharge of his professional duties till 1852-53, when he retired from duties as a Professor of the University of Edinburgh, a year before a gold medal of $625. was obtained to him by government. He lived for a time in retirement at Lasswade, near Edinburgh; and died at Edinburgh on the 3rd of April 1864. In the follow-

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Brougham. Having been restored to his rank in the army, he became a general in 1841, and held the post of governor and commander-in-chief of Gibraltar from 1848 till 1849. He died at Bow lofts, near Oxford, on the 9th of May, 1849. He was the author of a translation of General Regnier's 'Campaign in 1801 in the East and in Egypt,' and afterwards of a more correct original narrative of those events, published under the title of 'An Historical Account of the British Expedition to Egypt.' His other publications were 'An Enquiry into the Military Force of the British Empire' (1804), 'Campaigns in Poland with Remarks on the Russian Army' (1811), and a 'Sketch of the Military Politics of Russia,' in which he was severely criticized at the time of its appearance in the 'Quarterly Review.' Sir R. Wilson replied in an animated pamphlet.

WIN, PETER DE, was born at Stone, in Staffordshire, in 1784. He was apprenticed to Raphael Smith, the mezzotint engraver, and had for a fellow pupil, Fillion, the Academician, whose sister he afterwards married. Abandoning engraving, Mr. De Wint adopted painting in water-colours as his line of art; and was elected a member of the Society of Painters in Water-Colours, in 1810, six years after its foundation. For nearly forty years his pictures were among the leading attractions of the annual exhibitions of that society. He painted almost exclusively home scenery;—views in Kent, Lincolnshire, &c.; among the lakes and mountains, in Cumberland and Westmoreland; round the Thames, the Wy, and other rivers, corn-fields, hayfields, water-mills, and the like, being especial favourites with his pencil. His style was bold, broad, and vigorous, his colour treb; and in general effect his pictures represent some of the most striking pictures I have seen of England. But he was wasting in refinement, and in aiming at breadth of effect he was often negligent of details. His touch and texture were peculiar; but, allowing for an almost inevitable meanness, very agreeable and effective. Avoiding all the magic of the great water-colour painters for producing force and brilliancy, he continued to paint according to the method of the founders of the English school with washes of transparent colours only, but what he thus lost in power and variety he, to some extent, made up in the expression of his nature. He died on the 30th of June, 1840, in his sixty-sixth year.

WITCH-ELM, or WYCH-ELM. [ULMUS.]

WOHLERSTE, [MINERALOGY, S. I.]

WOOD-PIGEON. [COLUMBIA.]

WOODRUFF. [A. S.]

WOODSTOCK. [CANADA, S. 2.]

Wordsworth, REV. CHRISTOPHER, D.D., was born June 9, 1774, at Cockermouth, Cumberland. He was the youngest son of Brownesworth Wordsworth, the younger brother of William Wordsworth the poet. He was educated at Hawkshead grammar-school, and at Trinity College, Cambridge, where he went in 1792, and took his degree of B.A. in 1796. He was elected Fellow of Trinity College, October, 1796, and was elected by his college to the living of a vicar in Westmoreland. In the same year he published 'Six Letters to Granville Sharp, Esq., respecting his Remarks on the Uses of the Definitive Article in the Greek Text of the New Testament.' 8vo, a volume which was praised by Bishop Horsey and Bishop Middleton, and procured him the patronage of Dr. Manners Sutton, Archbishop of Canterbury, who appointed him his domestic chaplain. He married October 6, 1804, Priscilla, daughter of Charles Lloyd, Esq., banker, of Birmingham, and in the same year was appointed to the rectory of Aby and Obey-with-Thorne in Norfolk, which vicarage he resigned in 1804. In 1805 he published 'Six Letters to Granville Sharp, Esq., respecting his Remarks, and a Second Letter to Lord Teignmouth.' In 1814 he published 'Sermons on various Occasions,' 3 vols. 8vo. He was appointed rector of St. Mary's, Lambeth, Surrey, and of Sundridge in Kent, April 10, 1816. Soon afterwards he served as chaplain to the House of Commons. On the 26th of July, 1820, he was installed Master of Trinity College, Cambridge. In the same year he exchanged the livings of Lambeth and Sundridge for the rectory of Buxted, with Uckfield, in Sussex. In 1824 and 1825 he published two elaborate volumes on the authorship of 'Ikeni Basiliké,' which he unhesitatingly ascribed to Charles I. The first volume, 'Reasons for supposing Ikeni Basiliké to be the work of Charles I., and answers,' 8vo; the second, 'King Charles the First the Author of Ikeni Basiliké further proved, in a Letter to his Grace the Archbishop of Canterbury, in Reply to the Accusation,' 8vo, 1822. These two works were received with much applause, and were succeeded by the present Master, Dr. Whewell. From that time he resided at Huxred, where he died February 8, 1846. He was buried in Buxted Churchyard. He had three sons. I. REV. John Wordsworth, born July 1, 1805, was Fellow of Trinity College, Cambridge, and died in 1839. II. Right Rev. Charles Wordsworth, M.A. and D.C.L. graduated at Christchurch, Oxford, was second master of Winchester College, and is now (1858) Bishop of the United Diocese of St. Andrew's, Dunkeld, and Dunblane, Scotland, to which he was consecrated in 1853. 3. Rev. Christopher Wordsworth, canon of Westminster, the author of many works, and among them Memoirs of his uncle William Wordsworth.

Wordsworth, William, was born at Cockermouth, Cumberland, in 1770. He was the youngest son of John Wordsworth, attorney-at-law, and law-agent to Sir James Lowther, afterwards Earl of Lonsdale, by Anne, only daughter of William Cockson, a mercer at Penrith. The Wordsworths came originally from Penistone, in Yorkshire, and on the marriage of their ancestor with an Englishwoman, and the name of Wordsworth's maternal grandmother was Crackanthorpe, of the Crackanthorpes of Westmoreland. The poet was therefore by pedigree a thorough North-of- England man. He had three brothers—Richard, who was the oldest, and John Wordsworth, attorney-at-law, and law-agent to Sir James Lowther, afterwards Earl of Lonsdale, by Anne, only daughter of William Cockson, a mercer at Penrith, and died in 1816; John, who was nearly three years his junior, and who became commander in the navy, and perished by shipwreck off Weymouth in 1800; and Christopher, the youngest, noticed above. [Wordsworth, W. A. C. C. S.]

He was the son of John Wordsworth, who was born in 1739, and the mother of his father died in 1778, when the poet was only eight years old; the father died in 1783, when the poet was but thirteen.

Till about the time of his mother's death, Wordsworth's eldest brother was at the school at Cockermouth and partly with his parents at Penrith, where he attended a dame's school; but about that time he was sent, with his elder brother, to a public school at Hawkhurst, in Lancashire, whither his two younger brothers were sent. His second brother, who remained, left very much at liberty to read what he chose, and to wander about in the neighbourhood. "I read," he says, "all Fielding's works, 'Don Quixote,' 'Gill Blas,' and any part of Swift that I liked; 'Gulliver's Travels' and the 'Tale of a Tub,' and 'An Essay on Man,' and the 'Iliad' and 'Odyssey.' He first began to write verses, as school-exercises, and to store his memory with observations of English rural nature. He became a fair Latin scholar, and was taught something of mathematics; but, upon the whole, the acquisitions possible at the school were not great. At the death of Wordsworth's father, which occurred while he was still at school, it was found that the principal part of his property consisted of a debt of 6000l. owing to his estate by Lord Lonsdale; a considerable part of what there was besides was expended in a curious experiment of which Wordsworth remained, when scrapped together, to complete the education of the children, under the guardianship of two uncles. By them Wordsworth was sent, in October, 1797, to St. John's Coll. Cambridge, to be educated at that college until January 1, 1801, when he quitted Cambridge altogether, having taken his B.A. degree. His recollections of his alma mater were by no means affectionate or reverential. He says:—

"I did not love.

Judging not perhaps, the timid course

And the much-studied essay, to

To see the river flow with ample range

And lower pace":—

and, in particular, he was repelled by the mechanical manner in which religious forms and exercises were gone through.

"Intellectually," says his nephew and biographer, "he and the university were not in full sympathy with each other. He had never been subject to restraint: his school-
days were days of freedom; and latterly, since the death of his parents, he was almost entirely his own master. In addition to this, his natural temperament was eager, impetuous, and impatient of control. At college, however, he read and thought much; he studied Italian; and he began to set himself a number of questions in order to gratify his passion for the open air and for scenes of natural beauty and grandeur; and one of these tours, made in the autumn of 1790, with a fellow-collegian, was a pedestrian tour through France and Switzerland, at the very time when the French Revolution was beginning. In 1791, after taking his degree, he spent some time in London, and made a pedestrian tour in North Wales; and in the autumn of that year he went over to France, where he spent fifteen months in all, partly in Paris, partly in Orleans, and-chiefly in Normandy, in the district of Sées. The king was deposed when I was at Blois: and the massacre of September took place when I was at Orleáns. Wordsworth was no mere indifferent spectator of the scenes of the Revolution. At this time of his life he was a vehemcnt republican in France against all the rest of the world. He had friends too among the revolutionists of the Girondist party, and so fully did he share their enthusiasm that he even entertained the intention of becoming a naturalised Frenchman, and throwing overboard the English ideas of criticism and the ornamental side of poetry. By this time he had begun to believe that what it chiefly wanted to ensure a glorious success was the activity of a few steady, virtuous, and lofty minds, such as he was conscious of possessing. Of this he was still more convinced after Robespierre began to exercise his influence on the public mind. He considered the ideas of activity as he himself says, that is to say, he would have been one of Robespierre's victims, and have died on the scaffold with some of his Girondist friends. Circumstances however fortunately obliged him to return to England towards the end of 1793, a little before the execution of the king. He took up his abode for the time in London; but his thoughts were still on the other side of the Channel, and he followed the farther course of the Revolution with intense interest, complicated by personal interest. He was soon, however, becoming wearied of what he had engaged in an enterprising enterprise. Much of the influence of this time, though greatly modified, remained with Wordsworth throughout his life.

From 1792 to 1795, Wordsworth lived in a desultory manner in London and at a part of England. He had been destined for the church, and his friends were much disappointed at his preferring what seemed to them an idle and sinless life. His religious, as well as his political, principles, at this time were not of a kind conformable to the society to which he was destined; and his abilities for making a living by his intellects, was his passion; and he had already conceived the possibility of a new kind of descriptive poetry, which should do justice to the infinite variety of natural appearances that had been unnoticed by the poets of any age or country. In the course of the year 1792, he had a visit from Scott, and the beginning of his friendship with that poet, is often given as the encouragement to Wordsworth to undertake a course of poetry. Scott, Wordsworth writes, informed him that he was about to publish a volume of poems of this kind in the heroic couplet; 'An Evening Walk, addressed to a Young Lady,' and 'Descriptive Sketches, taken during a pedestrian tour among the Alps.' It was the time of the rise of a new poetical spirit in England, and Grisley having just appeared in the field after Cowper, and the Scottish poets Burns being then in the full flush of his fame. New poets were also springing up; and one of these, Coleridge, thus describes the impression made on his mind by this volume: 'It was presented to me on the morning of the 18th of May, 1793, and as nearly as I can now remember, it is among the most important things that ever was published: 'During the last year of my residence at Cambridge, I became acquainted with Mr. Wordsworth's first publication, and seldom, if ever, was the emergence of an original poetical genius above the literary horizon more evidently announced.' Thibaud, however, did not, however, entertain the intention of continuing and for a while, Wordsworth's prospects were very uncertain. Having no independent means of livelihood, he contemplated entering the legal profession and supporting himself meanwhile as a political writer on the liberal side for the London newspapers. He even contemplated publishing 'Sentiments on a Discerning Generosity of a Young Friend, named Calvert, who, on his death in 1795, left him 900, expressly as a token of his admiration and of his wish that he would devote himself to poetry. This sum, judiciously managed, enabled Wordsworth to adopt a mediocrity between a life of study and one of travel. He cultivated various forms of intellectual and physical recreation at this time, and he exercised a wonderful influence over his spiritual and his physical, to live for some seven years, without any necessity on his part to undertake any employment incompatible with his freedom as a poet; and as it fortunately happened that, at the end of that time (1809), a sum of 8,600, was paid over to the family by the second Earl Lousdale in liquidation of the debt owing to their father by his predecessor, there was again a sufficiency of means for the poet's purposes.

In the autumn of 1796, Wordsworth and his sister settled at Racedown Lodge, near Crewkerne, in Dorsetshire; and here, living in a quiet and happy manner, he wrote his 'Salisbury Plain, or Guilt and Sorrow,' and began his tragedy of 'The Borderers,' neither of which was published till long after he had returned to London. In June 1797, Coleridge visited him, and paid his first visit to the Wordsworths; and 'for the sake of being near him when he had removed to Nether-Stowey in Somersetshire, we removed,' says Wordsworth, 'to Allfoxden, three miles from that place. This was in August 1797, and Coleridge, writes Wordsworth, 'was the result of the two poets the appearance in 1796 of the 'Lyric Ballads,' a small dodecimo volume, published by Mr. Cottle of Bristol, the first composition of which was the 'Ancient Mariner' of Coleridge, and the rest, to the number of twenty-five pieces, of which was also carried by Cottle, that was the first one of Cottle's, who has taken his 500 copies, the greater portion of which was remanufactured; and when Mr. Cottle shortly afterwards gave up business, and sold his copyrights to the Messrs. Longman of London, the copyright of this little volume was valued at £50, Mr. Cottle renewing it, before the end, also, by a subscription to Cottle's authors. Little affected by the indifference with which the volume had been received, or by the contemporaneous rejection of tragedies which they had respectively submitted to London theatre-proprietors, they were engaged in a new work. In 1798-9, they published in instalments from Grasmere, verse that made occasional excursions of business or pleasure. Thus in 1809 he made another tour in France; on his return from which he married Mary Hutchinson, whom he had known from his childhood. Wordsworth's sister still continued a member of the household, and the intellectual companion of William in all his labours. In 1803, the poet, his wife, and his sister, set out on a tour in Scotland, in the course of which they made the acquaintance of Scott, and gathered observations and impressions which served as future materials and subjects. Before their return, Wordsworth had written the lines that make the poet's eldest child, a son, named John, was born; and the poet's other children were all born either at Grasmere or at Allan Bank—a daughter, Dora, in 1804; a son, Thomas, in 1806; a second daughter, Catharine, in 1808; and the youngest, a daughter, Mary, in 1810. The period of Wordsworth's residence at Grasmere and Allan Bank (1799-1813) was the period of his memorable struggle against the critics, and of the slow and gradual recognition of his poetic genius. He was incessantly active, turning his observations and thoughts into poems, and he had projected and was occasionally laboring at his great philosophical poem in blank verse, of which 'The Prelude' and the 'Excursion' are the accomplished fragments. What he presented to Coleridge in the summer of 1806 was the unfinished manuscript of the poem. In 1808 appeared a second edition of the 'Lyric Ballads,' in two volumes, with numerous additions; and there were subsequent editions in 1809 and 1805. In 1807 appeared a distinct collection of pieces, entitled 'Poems in Two Volumes;' and in 1808 they entered into the 'Cumbrian Association' and the 'Invention of Cintra.' This last work was published contemporaneously with the first numbers of Coleridge's 'Friend,' to which Wordsworth contributed his 'Essay on Epitaphs.' In 1810 the poet wrote a portion of the letter-press for a volume entitled '楮Cornwall, Devon and Lancashire,' edited by Rev. Joseph Wilkinson—a fine mark of his interest in the lake scenery, and his desire to diffuse the love of natural beauty. It seems to have been Wordsworth's theory not only that the enjoyment of nature would have the beneficial effect on the minds of men in general, worthy of being systematically taken into account and reported to, but also, that it is part of the functions of the poet to minister this influence of nature, by permanently connecting himself with some one spot or district, so as to transfer its pecu-
lier facts and teachings into his poetry. Hence a greater fitness in the name ‘Lake Poets’ than was intended by those who invented it.

Wordsworth appeared professedly not only as a new poet, but also as the representative and champion of a new theory of poetry. In the volumes he had published up to this time he had not only exemplified his principles of composition in the poems themselves, but he had also propounded and illustrated those principles didactically in prefaces and dissertations. He held, with Coleridge, that the poet in the history of English Literature intervening between Milton's age and his own had been, with a few exceptions, a kind of interregnum in English poetry—a period during which, as Wordsworth said, 'the art of prosody declined as to themes and as to style; and what he claimed for himself and for those who were associated with him, was the merit of reviving the true notion and art of poetry. The following summary has been given of his views:—Poetry, and religious poetry, taking origin from emotion recollected in tranquillity; what the poet chiefly does, or ought to do, is to represent out of real life, scenes and passions of an affecting or exciting character. Now, men originally placed in such scenes or animated by such passions saw a nervous and lively passion, and as well, also, very few of them had employed nature herself; and the poet therefore in imitating such scenes and passions, will recall them more vividly in proportion as he can succeed in employing the same language. Only one consideration should operate to make him modify the natural methods of speaking the language of his own time; and that is, his own health; a poet, as a poet to give pleasure. All such words or expressions therefore as though natural in the original transaction of a passionate scene, would be unpleasant or disgusting in the poet's rebuke must be omitted. Purified added in accordance with his science, is an estimation of moving occurrence, whether in prose or in verse, would true poetry. But to secure still more perfectly their great end of giving pleasure, while they excite emotion, poets use the language of their subjects, to the metre and allusions, which had become a kind of property of the poetic corporation or guild, and which, though originally they might have arisen from genuine observation of nature, had by incessant repetition and attrition become mere lifeless artifices; while his imagination and powers of deduction at all resembling the language of real men and women under any circumstances, counting it rather the essence of their craft to use a certain conventional phraseology, called poetic diction, in which words were deformed out of their natural order, and the distortion regarded as metrical art.

These views naturally provoked opposition, as similar views had already done when urged by Bowles; and Wordsworth's poems, exemplifying these views, were either neglected or sneered at. Indeed, in 1811, one of his visionists he had selected, for many of his pieces, very simple subjects, and had written a language as close as possible to that of real life; and these pieces were fastened on by the adverse critics and held up to ridicule as childish, grotesque, &c. Thus began the great literary controversy as to Wordsworth's poetry—a controversy which lasted almost to the end of Wordsworth's life, though by that time his triumph was, on the whole, decisive, and his admirers included the best part of the literary world. His method was never at a loss for afflicting the appreciation of what he had already published, partly of the appearance of other poems, thrown out at intervals from his retreat among the Lakes, each making a new impression and some revealing the poet's powers dissolved, while his withering allusions were as subjects to the critics of the old school. In 1813 he took up his residence at Rydal Mount, not far from his former habitations; and here he remained till his death, allowing for occasional visits to London, a second tour in Scotland in 1814, a new continental tour in 1820, a tour in Holland and Belgium in 1823, in North Wales in 1824, on the Rhine in 1828, in Ireland in 1829, in Scotland again in 1833, in Italy in 1837, &c. Before his removal to Rydal Mount, his children Catharine and Caroline had died childless. In 1820, his brother Allan died. His poems were as yet no source of income to him; but just at the time of his removal to Rydal Mount, he was appointed, through Lord Lonsdale's influence, to the dispensation of stamps for the county of Westmoreland, a post which, with light duties and the advantage of permitting him to remain in the district of his affections, afforded him a little more than a hundred pounds a year. In 1814 he published his great poetic poem of ‘The Excursion.’ It had little commercial success and drew down the censure upon him more than before; including Jeffrey's famous verdict 'this will never do,' but at the same time it was more immediately popular; this, very shortly, by 'The Waggoner,' dedicated to Charles Lamb, and 'Sonnet on the River Duddon.' The poems had, most of them, been in manuscript long before they were published. In 1828 (by which time there had been new editions in favor of the previous editions) and 1839, Wordsworth's name was pronounced everywhere as that of a literary power of the highest order appeared Somnara and other Poems under the title of 'Mourning of a Tour on the Continent; several years afterward with the essays and his 1806 years. He had published his collected edition of his poems in seven volumes, re-arranging them in a new order on a peculiar principle of his own, and with new titles to the separate parts of his work. Several series of editions of his poems, which had never been published; and after Wordsworth's death appeared his autobiographical poem, 'The Prelude,' written in the early part of the century, and bringing down the narrative of his life till the period of his determination to become a poet after his first suicide, and the series of poems published under the title of 'Poems in Two Volumes' died, that in 1847. He was in D.C.L. of Oxford; in 1842 he had resigned his post of Distributor of Stamps, and in 1843 he was knighted and made Poet-Laureate. His wife and his sister, and two sons survived him. His only daughter Dora had married in 1841 Edward Quillinan, Esq., a gentleman who had been the army and the 1852 of the 20th century. They were the last to survive him. He had been married to a woman of genius in France, and for her he married for the health of Portugal and Spain, of her travel in which countries she published a journal; and after her return she died in 1847. The death of Wordsworth, in two volumes was published by his nephew Canon Wordsworth in 1851; and contains many letters, dictations, and conversations, illustrative of the occasions of his poems, of his character and habits generally, and of his progressive views of men and time. These letters were the result of his own composition and diligent observation of all that occurred at home abroad; and he expressed strong and decided views on great political events and movements of his time, such as war with Napoleon, Catholic Emancipation, the French Revolution of 1847, the Reform Bill, the Railway Mania, &c. His views on these subjects were generally Conservative; in contrast with those which he had held so strongly in life, and in some of his letters and conversations he alludes to this apparent change and gives the philosophy of it. In 1843 he had received from the Universities the title of 'Conservative' by publishing 'Two Addresses to the Freethinkers of Westmoreland.' He was during the last few or fifty years of his life a zealous and devout supporter of the Established Church of England. A lofty and severe man who, had not a strict moral manliness, but a sincerity and great horror of sin, was consecrated from first to last to the service of the great permanent, and the noble. His influence on the literature and especially on the poetry of Britain and America this century, has been immense, and is far yet to be exhausted.

and brother of Princess Dashkov. Semen Woronzow was for many years Russian ambassador to England, where he was first sent by the influence of Prince Potemkin, in 1792, to the British embassy till 1810, when, retiring from the service, on account of ill-health, he obtained permission from his government to remain in England, and resided in London as a private gentleman till his death in 1833, at the age of eighty-nine. His son WYATT, RICHARD, an eminent sculptor, was born in Oxford-street, London, on 16th May, 1755. Having chosen sculpture as his profession, he was placed in the pupil of Charles Ross, R.A.; and about the same time he entered the Royal Academy as a student. During the seven years which he served with Ross, he twice carried off medals at the Academy, and after leaving his master, he spent some time in the atelier of Boeio at Paris, and he completed his professional education under Canova, whose acquaintance he formed in London, and who kindly invited him to Rome, and offered him his advice and assistance in the prosecution of his studies. As a fellow-student, and the friendship here formed among the young students, who were ultimately to rank together as the first English sculptors in Rome, remained unbroken through life. With Canova Wyatt likewise retained the warmest friendship, in the death of the great Italian master. Wyatt went to Rome in 1821, and he made that city his permanent abode, only once making a brief visit to his native country in 1841. He died suddenly at Rome on the 29th of May, 1850.

Wyatt was a man of singularly gentle unsunsming temper, and quiet retiring habits. His whole life was spent in the diligent prosecution of his profession—at which he laboured often from dawn till near midnight. The number of his works is very great, and they are by no means inferior to many of his contemporaries. He was undeniably one of the first of his profession, and his works, combined with and especially his female figures, are beautifully modelled, always poised with grace and animation, and always present pleasing forms from whatever side they are viewed. His dripries too are invariably well cast, and he express TEXTURE. His anatomy is truly classical, and his treatment of the human form is as exact and true as it can be. As examples of his style may be mentioned his statues of 'A Nymph entering the Bath'—one of his most beautiful of his many versions of which, was that executed for Lord Charles Townshend, of the Bath; 'Shepherdess with kid'; 'idem with dog'; 'Olympia'; 'Ariadne'; 'Bacchus'; and 'Penelope,'—an exquisite statue executed for her Majesty; and his admirable groups of the 'Nymph Eucharis and Cupid'; 'ino and Bacchus'; 'Nymph of Diana taking a horn from a greyhound's foot;' and 'A Huntress with a Leveret and Greyhound'—his last work. He also produced many excellent portrait busts, some rilívi, and monumental sculpture. At the Great Exhibition of 1851, several of his works were exhibited, and the medal for sculpture was awarded to him on the recommendation of a number of the members of the Royal Academy, a bye-law of that institution rendering artists ineligible resident in England. Casts from several of Wyatt's work,—including most of those named above—are in the Crystal Palace at Sydenham.

WYON, WILLIAM, an engraver and designer of medals and coins, was born at Birmingham in 1795. The pursuits and associations of his family (of German descent) were peculiarly calculated to give direction to his mind and to foster whatever natural abilities he possessed. His grandfather, George Wyon, engraved the silver cup embroidered with a design of the assassination of Julius Caesar, which was presented by the city of London to Wilkes. His father, Peter Wyon, to whom, in 1803, he was apprenticed, was a die-sinker of reputation at Birmingham, and with him was associated William's uncle, Thomas, as partner, to whom young Wyon was much indebted. The earliest of his productions of which we find any marked notice were copies of the heads of Hercules and the left of the head of George IV. engraved for the Society of Arts, and was purchased by it for distribution as an agricultural prize. A second gold medal from the same body marked the appearance of Wyon's group—"Victory drawn by Tritons." A few years later he completed a figure of Antinous, which so delighted his father that he let it set in gold, and wore it constantly until his death. Wyon came to London in 1816, and won his way through a competition to the post of second engraver at the Mint. Sir Thomas Lawrence was the umpire, and the trial piece of the head of George IV. His prospects were now most fa- vorable, and his situation altogether agreeable to him—for the chief engraver, Thomas Wyon, was his friend and cousin.

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But unexpectedly the latter died, and Mr. Pritzruci was nominated in his place. The new engraver and his chief assistant could not agree. Pritzruci, a skilful artist, is said to have been indolent, and while reserving to himself the greater share of the honour and benefit, he left the greater amount of labour to Wyon. Under a new Master of the Mint these differences were compromised by an arrangement, which left Pritzruci nominally chief engraver until his death, but gave half his salary to Wyon and the other half to Pritzruci. On the death of the younger artist these occurrences, further than to observe that the younger man found an enthusiastic champion who issued a memoir of his life, and a list of his works, then exceeding two hundred in number. The Royal Academy marked its opinion of this controversy, and of Wyon’s own merits, by electing him in 1835, an Associate, and in 1838 an Academician, the first of his department who had ever obtained these honours.

Wyon’s works may be divided into coins—pattern pieces of coins not supposed to be issued seals. His coins include those of the later years of the reign of George IV., all those of William IV., and all those of her present Majesty which appeared in Wyon’s lifetime. He followed Chantrey’s models in the coins of both the kings, but was his own designer in the coins of Victoria. The pattern pieces include one of ten pounds for William IV., and one of five pounds (among several others) for the present Queen, which bore a figure of Una on the reverse. These pattern pieces did not become coins through the influence of the body, who, at that time, under the title of moneymen, were the privileged coiners of the country, and who knowing that increased expense would be necessary, took care of their profits, and did not trouble themselves about Wyon’s disappointment or the interest of the public in the increase of objects, and were produced for many different and admirable objects. There are war medals for the Peninsular victories, for Trafalgar, for Jellalabad and Cabul; scientific medals for the Royal Society, Royal and London Institutions, Geographical, and similar societies, native and foreign artistic medals, as for the Royal Academy and Art Union educational, as for Harrow, a gift by Sir Robert Peel; an testimonial, as in the case of the Brodie medal, which bore a third of the man in the same house; it was struck. These medals have for their obverse heads taken from the antique, a few modern, and in some cases, then living personages; and the author had generally aimed, as a matter of course, at his own characteristic fitness being the pure strain of the prehistoric age, the accompanying circumstances, thus Cholmondeley selected the Peel-Harvey medal, while heads of Lord Bacon, Sir Isaac Newton, Dr. Wallis, and Sir Francis Chantrey, were respectively and appropriately connected with the medals of the Royal Institution, the University of Glasgow, the Geological Society, and the Art Union. Many—and among them some of the best—of the reverses were from his own designs; while for others Wyon was indebted to Flaxman, for whom he had an enthusiastic veneration, Howard, and Stockard, who contributed the reverse, to the medal of court. Wyon’s increasing eminence was shown in the various commissions he received from foreign countries; we may especially mention his engagement for a series of Portuguese coins.

The characteristics of Wyon are the combination of two (often opposing) qualities, strength and delicacy, with the indispensable merit of likeness in his portraits; taken for all in all, we have had no such medal engraver since the days of Simon, the artist who shed so much lustre on this department in the days of the Commonwealth. Wyon died at Brighton, October 29, 1851, in his fifty-seventh year, a son, Leonard, who having aided him in his lifetime, inherited much of his skill at his death. To the latter we owe the well-known medal of Wordsworth; and his name is connected with that of his countryman, the Great Exhibition; and is thus gratifyingly associated in art as in blood with the subject of our present notice, whose latest works were in commemoration of that same assemblage of the world’s industrial and artistic fruits.

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YARRELL, WILLIAM, a celebrated British naturalist, was born in Duke-street, St. James’s, Westminster, in June, 1784. His father was a newspaper agent, and to his business his son succeeded, and continued in it till nearly the close of his life. When young he was fond of field-sports; but was not only the first shot, but the first angler of his day. The accurate habit induced by his superiority in these sports, was the prevailing character of his mind. He was not only the first shot in London, but for many years the first sporting authority upon all that had to do with the habits, laws, and manner of keeping of British birds. It was the same with fish. Not satisfied with obtaining his prey, he examined it, preserved it, and described it, and thus became a naturalist. At the age of forty he became a Fellow of the Linnaean Society, and from this time he gave up the gun and rod for the pen. From 1825 to the year of his death, 1856, he became a constant contributor to the Transactions of the Linnaean Society, and the various Journals devoted to natural history literature. His earliest papers were devoted to birds, as the following titles of some of his first scientific contributions show:—On the Change in the Plumage of some Hen-Pheasants (Philosophical Transactions, 117); On the Occurrence of some rare British Birds (Zool. Journal, II.); On the shall horned appendage to the eye, mandible in very young chickens (Ibid.); On the Anatomy of Birds of Prey (Zool. Journal, III.); On the Structure of the Beak and its Muscles in the Crosebill (Zool. Journal, IV.). He was one of the first members of the Zoological Society, and contributed not a few to the embellishment of the society and of the Cambridge University. In the first volume of papers published by the Society, Mr. Yarrell contributed no less than seventeen. They exhibit a wide and accurate knowledge of the forms not only of birds but of fishes and mammals. In these papers his conclusions are very sound, and they are very accurate. This is the more remarkable, as Mr. Yarrell had not the benefit of a medical education nor any further means of instruction than those supplied by his own industry. It was in these earlier papers that he demonstrated the true nature of White Ball, and showed that this pet morsel of the London epicure is a true species of fish, and not the young of the Shad, the Herring, or any other species of fish, as had been supposed up to his time. He did, however, consider that this British zoology, many of his papers being devoted to foreign animals, as the following:—On the Anatomy of the Lesser American Flying Squirrel; On the Woolly and Hairy Penguinea of Dr. Latham; On the Traches of the Stanhope Crab; and subjects of his research work. In this case the animals dying in the menagerie of the Zoological Society in Regent’s Park. He was always an active fellow of the Society, and one of its vice-presidents at the time of his death. He took a deep interest in the progress and development of the Gardens, as well as in the diffusion amongst the people of a taste for his favourite science. His various papers, amounting to upwards of seventy, the names of which are given in the ‘Zoological Bibliography of the Bay Society,’ prove him for the two great works of his life, the histories of British Birds and British Fishes. The ‘History of British Fishes’ appeared in two vols. 8vo, in 1836. It contained original descriptions, with an account of the habits, and a wood-engraving of every British fish. It was in every way an admirable work, containing accounts of several new fishes, with such descriptions as enabled the naturalist to distinguish them, whilst they were rendered by the agreeable style in which they were written attractive to the dullest of anglers. A second edition appeared in 1839. The ‘History of British Birds’ appeared in 1843. It was on the same plan as that of the fishes. The illustrations in wood were accurate and beautiful, and highly creditable to the enterprise and taste of his publisher Mr. Van Voorst. No work on the subject since Mr. Yarrell’s has become so popular. In many of his details, especially his picturesque tail-pieces, it imitated his great predecessor, but in point of accuracy of description and the homely
truefulness of his account of the habits of birds Mr. Yarrell had made. At the time of his death Mr. Yarrell was treasurer of the Linnean Society, and had been elected vice-president during the presidency of Robert Brown. Although one of his earliest papers was published in the 'Philosophical Transactions,' Mr. Yarrell was never made a Fellow of the Royal Society. He was continually proposed, but some unobjectionable objections having been made to his admission he withdrew his certificate, and although in the latter part of his life, the Royal Society would have gladly admitted him amongst its fellows, and his certificate was given the 1st of December, 1836. He was interested at Bayford, Herts.

YEAST, a substance found on the surface of fermenting liquors, and when removed capable of producing fermentation in other liquids susceptible of this action. On placing Yeast under the microscope it presents a number of cells imersed in a mass of amorphous matter. The cells are sometimes single, and at other times several are united together in a kind of chain. These cells are supposed to partake of a fungoid character, and they have been called the ferment-cells, and are supposed to have been constituted for the reception of this organism, under the name of Saccharomyces Cerevisiae.

This plant has been supposed to be the active cause of fermentation, and the carbonic acid given off during that process. The phenomena of the fermentation are, for the most part, observable on the plant. This seems to be a misinterpretation of the phenomena, as the plant is probably the result of the carbonic acid given off during the process of fermentation rather than the cause of it. These ferment-cells originate in liquids, independently of other cells, and are truly instances of the formation of cells in a free fluid. He observes, however, that they have no power of reproducing other cells. The whole subject of the nature of the cell has been much discussed by chemists, botanists, and philosophers, and their development, as well as the phenomena of fermentation in general, require further elucidation. (Schleiden, Principles of Scientific Botany; Microscopic Dictionary, articles 'Fermentation,' 'Torula,' 'Yeast.')

YELLOW COPPER ORE. [Mineralogy, 8.1.] YOUNG, THOMAS, M.D., was born June 13, 1773, at Millerton, in Somersethshire. He was the eldest of ten children of Thomas and Sarah Young, who were both Quakers. He was sent to school at Stapleton, near Bristol, and in 1782 was sent to the school of Mr. Thompson, at Compton in Dorsetshire, where he remained nearly four years. During this period he studied, besides Latin and Greek, the French, Italian, and several other languages. He was then sent back to his native city, where he devoted himself almost entirely to the study of Hebrew, and to the practice of turning and telescope-making, which he had been taught by a usher of Compton school. In 1787 he accepted, in conjunction with Mr. Hodgkin, an engagement as private tutor to Hudson Gurney, grandson of Mr. David Barclay, of Youngsberg, near Ware, in Hertfordshire. There he remained till 1792, devoting his leisure hours to the prosecution of his studies in Greek, Latin, and modern languages, Oriental and Hebrew, algebra, fluxions, natural philosophy, and the 'Principia' and 'Optics' of Newton. Mr. Hodgkin in 1793 published 'Calligraphia Graeca,' which he dedicated to Young, who had suggested the work, and furnished the writing.

In 1794 Young moved to London, in order to study medicine by the advice and on the invitation of Dr. Brocklesby, an eminent physician, who was his maternal uncle. Young was by introduction introduced to Mr. Burke, Sir Joshua Reynolds, and other literary and scientific men, and he became connected with the Royal Institution, Ballie, Cruikshank, and John Hunter. In the autumn of 1793 he entered himself a pupil at St. Bartholomew's Hospital, and in October 1794 proceeded to Edinburgh, still further to prosecute his medical studies. There he attended the lectures of Dr. Edkins, and was induced to give up some of the external characteristics of the Quakers; but the change of habits and associations in a short time led to a total and permanent separation from them. He mixed largely in society, began the study of music, and took lessons on the flute, and also private lessons in dancing, and frequently attended the performances at the theatre. In the summer of 1795 he made a tour to the Highlands of Scotland.

In October 1795 he left London, in order to make a tour on the Continent. He took a doctor's degree at the university of Gottingen, and prosecuted his studies there during nine months. In May 1796 he made a tour to the Alps, and ascended some of the deepest mines. After leaving Gottingen, he visited Gotha, Erfurt, Weimar, Jenne, Leipzig, Dresden, and Berlin, and returned to England in February 1797.

Almost immediately on his return home Young was admitted a Fellow Commoner of Emmanuel College, Cambridge. Dr. Brocklesby died December 13, 1797. He had fostered the promising talents of his nephew, had prepared for the latter his general and professional education, and now left him but about 10,000l. and his house in London, with furniture, library, and a choice collection of pictures, mostly selected by Sir Joshua Reynolds. After this, Young resided sometimes at Cambridge, and sometimes at Bath, Wortington, and elsewhere.

Having, in 1799, completed his last term of residence at Cambridge, in 1800 he settled in London, and commenced the profession of medicine. His practice, however, was rather less extensive than were his studies. It was not till 1805 that he gave to the world, at his own time to his favourite literary and scientific pursuits. Several years were then required to elapse between the date of admission of a student at Cambridge and the granting of his degree in medicine, so that Young did not obtain his medical degree till 1805. He was elected a fellow of the Royal Society in 1807. Before the latter date he had written his memoir, 'Outlines and Experiments respecting Sound and Light,' which was read before the Royal Society, and printed in their 'Transactions.' Other papers on 'Optics and Light and Colours' followed, which the Council of the Royal Society selected for the Bakerian lectures.

In 1801 he accepted the office of Professor of Natural Philosophy at the Royal Institution, which had been founded, as he understood, for the promotion and establishment of the higher branches of science in this kingdom. Young was in 1810 he was appointed Foreign Secretary to the Royal Society, an office which he held during the remainder of his life, and for which he was well qualified by his knowledge of the principal languages of Europe. He married July 14, 1804. After fulfilling for two years the duties of Professor of Natural Philosophy to the Royal Institution he resigned the appointment.

During the time he was connected with the Royal Institution he delivered sixty lectures, which form the substance of his great work, which was published in 1807, and entitled 'A Course of Lectures on Natural Philosophy and Mechanical Arts.' This work contains also his optical and other memoirs and a clased catalogue of all his publications. A new edition was published in 1845, 'with References and Notes, by the Rev. P. Kelland, M.A., F.R.S., &c., illustrated by numerous Engravings on Copper,' 8vo.

These lectures embody a complete system of natural and mechanical philosophy, drawn from original sources; and are distinguished not only by extent of learning and accuracy of statement, but by the beauty and originality of the theoretical principles. One of these is the principle of interference, which was first suggested by Young, and the name was very unfavourable. The novel theory of undulation especially was attacked in the 'Edinburgh Review,' and Dr. Young wrote a pamphlet in reply, of which only one copy is known. He was also assailed on account of his French philosophy, Fresnel, who entertained him similar to his own on the nature of light. The undulatory theory is now generally received in place of the molecular or emanatory theory. Among the other difficult matters of investigation in which Dr. Young was engaged, was his study of Egyptian Hieroglyphics, in which he first proceeded Champollion. [Champollion, J. F.]

In 1809 and 1810 Dr. Young delivered at the Middlesex Hospital a series of lectures on the elements of medical science and practice. In January 1811 he was placed one

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of the physicians of St. George's Hospital, a situation which he retained for the remainder of his life. His practice there, as elsewhere, is stated to have been eminently successful. In 1815 he published 'An Introduction to Medical Literature, including a System of Practical Noso logic, intended as a Guide to Students and an Assistant to Practitioners,' 8 vols. In 1816 he received the degree of Doctor of Medicine in the University of Mos cou for ascertaining the length of the second's pendulum, for com paring the French and English standards with each other, and for establishing in the British empire a more uniform system of weights and measures. He drew up the three regularly ordered volumes of 'The Description of Russia' in 1819. In 1821 he was appointed secretary to the Board of Longitude, and on the dissolution of that body he became sole conductor of the 'Nautical Almanac.'

Dr. Young at various times contributed eighteen articles to the 'Quarterly Review,' of which nine were on scientific subjects—the rest on medicine, languages, and criticism. Between 1816 and 1823 he wrote sixty-three articles for the 'Supplement to the Encyclopaedia Britannica,' of which forty-six were biographical. In 1821 he made a short tour in Italy in company with his wife. In August 1827 he was elected a Fellow of the Royal Society.

ZAGOSKIN, MIKHAIL NIKOLAEVICH, a Russian dramatist and novelist, was descended from a Tartar family, and was born on the 14th of July (O.S., 1792), at the village of Ramazay, in the government of Penza. He remained in his native village till the age of fourteen, receiving but a slender education, and learning no language but Russian, but he early showed a genius for literature, and could understand, and compounding a tale at the age of eleven. At fourteen he was sent to St. Petersburg as a clerk in a government office, and continued in that kind of employment till the outbreak of the war of 1812, when he became a private soldier in the Petersburg Dragoon Regiments. He took part in the campaign against the French, was wounded at the battle of Pokotuk, and before the close of the war rose to be adjutant to General Lewis at the siege of Danzig. By this time he had acquired some knowledge of French and German, his long dormant literary tastes revived, and not long after he had taken leave of a military life— he set up anonymously a comedy, called 'Prokaznik' or 'The Wag,' to Prince Shakovsky [Shakhovsky, S. 2], director of the St. Petersburg theatre, who had himself just returned to the duties of management, from the command of a regiment of Cossacks. The reply was so unexpectedly favourable, that Zagoskin on once made himself known, and Shakovsky even procured for him a post connected with the theatre, and another as an inspector of the Imperial 'Free and Imperial Literature,' where it was told that for his services in arranging to the books and catalogue the Russian one, he received the Order of St. Anne of the third class. This was the commencement of his career as a dramatist, which he pursued first at St. Petersburg, and after 1820 at Moscow, to which city he was transferred as director of the theatre. He wrote altogether seventeen original comedies, some in verse and some in prose, several of which met with distinguished success, and none failed except the last. The best known of his plays are 'The Courageous Man of the Metropolis, ' 'Bobotev, the Second, or the Metropolitan in the Country,' 'A Romance on the Highroad,' and 'The Journey Abroad.' It is worthy of remark that till beyond his thirtieth year Zagoskin had not written a line of verse, his ear had been insensible to the rhythm of sound and measure, and that in 1821, on some of his friends laughing at him for pretending to give his opinion on poetry when he laboured under this deficiency, he was piqued into saying that he would write he could write as much as he could after all, and setting doggedly to work, and making progress at the rate of four lines a day, correcting the metr on his fingers, he produced some verses that were not only rhythmically correct, but remarkable for their grace and freedom. After this he frequently wrote in verse, but deserted the operation; and when he determined to write a romance in imitation of Walter Scott, one chief inducement was to enjoy a double freedom from the trammels of rhyme and the rules of the drama. The tale he produced, 'Yuri Miloslavsky ili Russky roman v 1612 Godu' (George Miloslavsky, or the Russians in 1612,) 3 vols., Moscow, 1827, described the state of Russia at the time that it was nearly conquered by the Poles. The success it met with was prodigious. 'The appearance of this romance,' says Zagoskin's biographer, 'at that time, was a signal step in the literary and social career of Zagoskin. The enthusiasm was unbounded and unanimous; few indeed were there who did not fully share it. The public of both the capitals, and after them, or rather with them, the public of all the provincial towns, gave it a cordial reception. The Czar to whom 'Miloslavsky' is read by all Russia that can read, and not without cause; the Russian mind and soul, and even the Russian way of speaking, were for the first time represented in Russia in this romance. An English translation of it appeared in London in 1834 under the title of 'The Young Muscovite, or the Poles in Russia, edited by Captain Frederic Chamier, R.N.,' and was said in the preface to be 'edited from a manuscript translation of the book made into English by a Russian lady of high rank and two amiable daughters,' to which the editors, for it appears that there were more than one, took the liberty of adding 'an underplot by which the characters of the chief actors are further developed. Although of course these altera tions do nothing to enhance the value of the book as a picture of Russian life in those characteristic ages, but as correct, they are not so extensive as to spoil it. Speaking of it from a full perusal of the original, we should say that 'Georgy Miloslavsky' was an amusing third-rate tale, rather unequal in its progress, and falling off sadly toward the end. Zagoskin was hailed as the Russian Walter Scott. For his next tale 'Rostavlev,' a story of Russia in 1812, in which he introduced some of his own adventures, there was an unheard-of competition in the Russian publishing world, for which purpose the story of the hero of the novel is a real poet for the copyright, but it was far from attaining the success of its predecessor. Zagoskin went on writing novels and romances, and in general founding a play on each after it appeared; but the merit and popularity of his works went steadily on increasing, and the productions of 1827 were considered to rival 'Yuri Miloslavsky,' or even 'Rostavlev.' He continued to reside at Moscow, where he enjoyed the additional appointment of director of the Armoury of the Kremlin, and was a well-known and popular member of the best society, which his never-failing good humour and disposition to Merriment qualified him both to enliven and to enjoy. Almost his only work besides his plays and novels was a collection of essays entitled 'Moskva i Moskvochki' (Moscow and the Moscovites,) which ran to three or four volumes, originating in gout, which he combated by homoeopathy, he suddenly expired at Moscow on the 23rd of June (O.S.)
1839. Soon after his death a life of him by Aksakov appeared in the 'Moskвитянin,' from which the foregoing particulars have chiefly been taken. His best works have an interest both to the native and foreigner from the purely Russian tone of their language and spirit, as indeed in every country the most popular national romance is a valuable clue to the key of national character.

ZAHRTMANN, VICE-ADMIRAL CHRISTIAN CHRISTOPHER, Hydrographer to the Danish Admiralty, entered the naval service of his country as a cadet in the year 1805, and afterwards rose to be a lieutenan. He has been undertaking many voyages, among which the war which terminated in 1815; acquiring the character of being one of the most able and accomplished officers of the Danish navy. At the general peace he betook himself entirely to geodetical and hydrographical work, and administration. Professor Schoumaker in the measurement of the Danish coast of the meridian. After a cruise to the West Indies, during which he made a chart of a portion of their seas, and set up an observatory on the island of St. Thomas, he was appointed Admiralty to Admiral Loverborn as director of the Hydrographick Office at Copenhagen. In this capacity, notwithstanding much prejudice respecting the publication of documents, he brought the labours of his department in an available form before the world, and with the highest degree of success. He has become so important to the navigators of all nations, on which his fame rests, as the charts of the coast of Denmark, with accurate soundings between the numerous islands, accompanied by determinations of the currents and trigonometrical reductions of the coast. His 'Chart of the Island of Iceland,' published in 1843, was indeed the greatest boon to all seamen, and to those of Britain in particular; whilst the 'Dancke Lods' (Danish Pilot), which is a complete description of all the seas surrounding this island. It has been translated, under the direction of Admiral Sir Francis Beaufort, F.R.S., late Hydrographer to the British Admiralty, into both the English and French languages.

He was also master-general of the naval ordnance of the Danish navy, had two maizes, a meteor bureau of Copenhagen, and a chamberlain of his sovereign, as well as a knight grand cross of the order of Dannebrog and Dannebrogsman, and a knight of four foreign orders, Russian, Prussian, French, and Greek.

He was an honorary member of the Royal Geological Society of London, and communicated to that Society, in 1830, shortly after its foundation, an account of Danish discoveries on the East Coast of Greenland in the preceding year. The paper, which was read at the meeting of the Geographical Society of Paris, appears in the first volume of the Journal of the former Society. In the same work, vol. iv., is an elaborate paper by him entitled 'Remarks on the Viewers to the Northern Hemisphere, according to the Zeni of Venice;' in which, communicated to the society in 1835, he arrives at the conclusion that those voyages, at least in the main points, are mere fabrications.

ZARIBNIS. [STURMILDE.]

ZARAGOZA. [SIRAGOMA.]

ZEALAND, NEW, a British colony in the Pacific Ocean and in the southern hemisphere, consists principally of two large islands, separated from each other by a wide strait called the Strait of Chatham, which is situated south of the two others, besides several islands, or rather islets, scattered along the shores. The more northern of the two large islands is called by the natives Te Ika a Maui, "The Fish of Maui," from a legend of its having been formed by a fish which opened the strait. The more southerly island is New Ulster, but is generally called North Island. The native name of the other large island is Te Waki Pounamu, "The Place of Pounamu," that is, of jade, used by the natives in forming their instruments of war. This island has been named New Zealand, but is generally called Middle Island. The small island has been named New Leinster, but is mostly called South Island, or Stewart Island. The islands lie between 34° 25' and 47° 20' S. lat., 168° and 178° 36' E. long. The two large islands are about equal length, and the entire length of the two is about 1000 miles. The width varies from a few miles to 300 miles. Stewart Island is about 60 miles in length and 60 in width. They are about 1200 miles eastward from Australia. The European population, according to the census taken in 1851, was 26,856, of whom 14,996 were males, and 11,860 females. The European population is now estimated at 40,000. The native population is estimated at from 80,000 to 100,000, of whom by far the largest number are inhabitants of North Island.

The British government in 1851 purchased the claims of the New Zealand Company for $266,370, to be paid out of the sale of waste lands in New Zealand. In the same year, by an Act of the British parliament (15 & 16 Vict. c. 72), a constitution was granted to the colony, the legislative power being vested in a Legislative Council and a House of Representatives. The seat of government is at Auckland. The colony is now divided into six provinces—Auckland, Wellington, and New Plymouth, in North Island; Nelson, Canterbury, and Otago (or Orokai) in Middle Island. Each district is placed under the management of a Superintendent and Provincial Council.

The colony has now four bishoprics—the bishopric of New Zealand, created in 1841, the bishopric of Christchurch, created in 1851, the bishopric of Wellington, created in 1857, and the bishopric of Auckland, created in 1858.

In 1849 the revenue was 48,384l.; in 1850 it was 57,745l.; it is now (1858) about 200,000l., the customs' duties amounting to 100,000l., and the land sales 80,000l. to 100,000l.

The greater part of the commerce of New Zealand is inter-colonial, but in 1858 the imports into Great Britain amounted to 100,000l., and the exports from Great Britain to New Zealand in the following year, were valued at 300,000l.

The principal staple is wool, sheep varying in 1841, 487 bales were imported from New Zealand into Great Britain, but in 1857 the import amounted to 3825 bales. Wheat is exported in large quantities to Australia, and there is sent to England, and there is sent to England, New Zealand. The mean annual temperature at Auckland is 58-43° Fahr., at London is 50-35°, at Naples is 61-49°, at Naples the mean temperature of the hottest month (January) is 79° Fahr., at Wellington it is 51° Fahr.; at London the mean temperature of the hottest month is 64°, and of the coldest month 37°. Lithium is known of the minerology of New Zealand. In October 1852 gold was discovered at Coronandel, about 40 miles E. from Auckland, on the peninsula forming the eastern side of the Gulf of Hauraki, between the harbours of Waihau on the western side and Mercury Bay on the eastern side. Gold has since been discovered in Nelson Province, and diggers are at work there. The chief export is wool, sheep and cattle being very large. Specimens of quartz-rock have been found exceedingly rich in gold. Copper has been found and wrought to some extent, but no lead or silver. Both islands contain coal, which is found at the surface, but mining for it has not yet been attempted.

The chief towns and villages in the colony of New Zealand are the following:

Auckland, the seat of the government of the colony, is built on the southern shores of the harbour of Waitemata, and is the southern port of New Zealand. It has an efficient depth for vessels of considerable burden. The town stands on cliffs of sandstone of moderate elevation, backed by rising ground. Several volcanic cones rise in its immediate neighbourhood, at the base of which are hard stones, grit for gravel roads, and easily worked; the sandstone of the cliffs, though soft, harder by exposure to the air, and is also a good building material. Some of the caves that occur in the cliffs have been used by the natives as places of sepulture, and the bottoms are covered with
human bones. The houses in the town are mostly of wood. The town is situated in a part of the island where the soil, though light, is fertile, and easily cultivated, and it has easy communication with all the countries both to the north and to the south. Many of the English, who settled on the island before the foundation of the colony, reside in the harbours marked of Auckland and Nelson, and small coasting vessels visit Auckland. Around Auckland are four pensioner-villages for discharged soldiers. Auckland was incorporated as a borough on July 29th, 1851, the district by which it is formed extending 16 miles in length, and 2 miles in breadth. It is divided into four wards, of which three are in the town itself. The Tamaki Creek intersects the borough, is navigable for boats, and is made available for the commerce of the district. The borough is governed by a mayor, aldermen, and a council, the latter consisting of twelve members appointed by the Governor. 

St. Paul's church, a handsome building; two sets of barracks built of soperi; a public hospital; a market-house; a native botelery; public washing, bathing, and drying grounds; several churches; and a bank. There are also several bridges, wharfs, and landing-places. The governor's residence and the bishop's are closely adjacent, and are about four miles from the town, on the banks of the Tamaki, is St. John's College. There is a church at each of the pensioner-villages. The population of Auckland in 1849 was about 4000; in the district in 1851 there were 8840, of whom 4921 were males, and 3919 females. The flag-staff of the barracks is in 51° 51'. 27°. 8 lat., 174° 42°. 10 E. long.

Wellington, the principal settlement of the New Zealand Company, founded in 1840, is on the shores of Port Nichol- son, in the island of New Ulster, but for governmental purposes the town and the whole of the district are comprised in the province of New Munster. Port Nicholson lies about 47° 30' North latitude, 175° 20' West of Greenwich. It is surrounded by mountains, except at the alluvial tract through which the river Hutt, or Eiritong, reaches the sea. These mountains rise abruptly from the water's edge, except in the most south-western corner of the harbour, where a strip of flat land extends for about a mile broad and two miles long, the soil of which is composed of sand, shells, shingle, and vegetable earth. On this flat ground, which surrounds that portion of Port Nicholson called Lambton Harbour, the town of Wellington has been built. It extends about three miles in the form of a semicircle round the harbour. The flat ground not being considered sufficient for the town, the hills south of it were included. As these hills are generally too steep to build on, only the most convenient parts were selected for that purpose, and thus the most distant points of the town are nearly four miles from the harbour. In 1848 there were 325 houses, of which 46 were of brick or stone, 303 of wood, and 171 of clay and wood, or other materials. However, the government has attempted to construct roads since, near the wharfs and jetties, which have been built so that vessels of 70 tons can unload alongside of them. There are two churches, and an Episcopal chapel, a Presbyterian chapel, five Wesleyan chapels, three other Dissenting chapels, and one Roman Catholic chapel, with a Roman Catholic bishop; there are also an hospital, a bank, a savings bank, a mechanics institute, a horticultural society, a custom-house, an exchange, a jail, two sets of barracks, and the residence of the lieutenant-governor. There are also various other kinds. Most of the public buildings are of wood only. The population of the district in 1851 was 5722, of whom 3133 were males and 2589 females. The town is well supplied with water by streams which run parallel with the coast and to the sea. Every public-house is compelled by the terms of its licence to keep burning; the streets are not paved, but excellent roads have been made in several directions along the coast to the valley of the Hutt, and towards that of Wairarapa. Two railroads have been constructed in the district, and all communications in the town, every public-house is compelled by the terms of its licence to keep burning; the streets are not paved, but excellent roads have been made in several directions along the coast to the valley of the Hutt, and towards that of Wairarapa. Two railroads have been constructed in the district, and all communications in the town are well kept. The passage by sea from 80 to 100 miles have been already formed, and a communication by land has been opened with Canterbury, a direct distance of about 170 miles, to Lyttelton. Coal exists in great abundance in the vicinity; one seam at Nelson and one at Waiapu are 20 feet thick, and contain 1000 tons of inferior coal each. In 1852 a new seam of superior quality was discovered by a landship at South Wanganui, at the north-west corner of the island, about 60 miles from Nelson in a direct line by land, but easily accessible by sea. Copper is also found near the Mountains, and a quantity is worked on the south side of the river, near the sea. The town of Wellington, situated between two small streams, the Huttoki and the Huri, near their entrance into the sea, on the northern side of the peninsula of which Cape Egmont is the western termination, and in the midst of which stands
the extinct volcano of Mount Egmont. There is no harbour properly so called, as the rivers are not navigable, and the mouths are small, nor is the roadstead a secure one. But this is the only drawback, for the country around has been called the garden of New Zealand. The land is so dry and so level that good roads are made with but little trouble, and the soil is the most fertile of any yet cultivated in New Zealand. The settlement was founded in 1841. In 1861 there were 45,425 males and 45,426 females. The town fronts the sea about half-a-mile from the beach, lying scattered on the slope of a hill, and contains two churches, one of them, a Wesleyan chapel also of stone, two other Dissenting chapels; a jail, schools, and several inns. There is a brewery and three flour-mills. Several bridges have been formed over the various small streams that descend from the sides of Mount Egmont and traverse the country. Iron and coal exist in the neighbourhing islands. Coal is found in abundance near the Wakanui River, about 50 miles N. from New Plymouth. Otago, in New Munster, is the district in which a settlement has been made by members of the Free Church of Scotland. It is towards the southern end of the island, on the eastern last. That town which lies called Dunedin is the Mounexuels River, which has been renamed the Clutha. The harbour formed by the mouth of the river is an excellent one; it is 13 miles long, and averages 2 miles in width; but the channel had difficulties which have been guarded against. It was opened by the late Mr. Hope and is now navigable. The settlement was made early in 1849; in 1851 the population was 1,740, of whom 994 were males and 746 females. The chief town, Dunedin, stands at the head of the harbour, and another has been formed near to the mouth of the river. Port Chalmers are 1,7° 46' S. lat., 170° 43' E. There was in 1848 only one place of worship, a Free Church chapel; but in 1850 the number of adherents to that doctrine barely reached a majority. The Clutha is a fine river, and, though it is free from a bar and consequent surf at its mouth, is said to be navigable for 60 miles for vessels of considerable burden. Coal is found at Coal Point, about 10 miles N. from the mouth of the Clutha, and at a spot within a quarter of a mile of the left bank. The珍惜 also been found in other places. A kind of green serpentine or jade is found here. Otaki is an exquisitely native village on the western shore of Cook Strait, about 50 miles N.W. from Wellington, and was the village where the islanders' last church missionary mission have taken much interest in this village, and not without success. Mr. Tyrone Power ('Sketches in New Zealand') describes it in 1848 as consisting of 60 houses neatly built, in the midst of well-frequented gardens. The houses consist of stone, or in some cases of bricks, in the number of pigs, cattle, and horses feeding about. The houses are of Maori architecture, with English doors, windows, &c. Mr. Power adds, that several of the chiefs kept 'a large number of hogs and fowls.' It is supposed that one of them taking an English officer to cash a cheque for him, having immediate occasion for money, which was done, and the cheque duly honored. Rauperaha, after peace was restored, exerted himself greatly in forwarding the building of a church, which was done entirely by the Maoris. It is only of timber, but it is the largest building they have ever yet erected, being 300 feet long, and in the chuchyard attached to it Rauperaha was buried in 1849 with due Christian rites. His son is still the acknowledged head of the tribe, and is very much respected and looking like a clergyman. The population in 1850 was 604. Petre is a small but flourishing little place on the west coast of New Ulster, and on the right bank of the Wanganui River, 4 miles from its mouth, and about 100 miles from Wellington. Its population in 1848 was 432, of whom 276 were males and 156 females. It consists of about 40 houses, a church, a school, a post-office, and a small jail, all of wood. It was founded in 1842, soon after the first settlement. It is a village of much great local reputation for its hams and bacon. In 1847 however an unfortunate quarrel with the natives of the valley led to the destruction of the place. On peace being restored the colonists returned, and resumed their occupation of the land, and a church and school is now stationed at Petre. Putikiraua is a native village on the Wanganui, opposite to the town of Petre. It has about 3,000 inhabitants, but the whole number in the district probably amounts to 5,000. The inhabitants have now applied themselves sedulously to industrial pursuits, bringing their produce down the Wanganui in canoes, which they manage with great dexterity down the rapids, with a cargo sometimes weighing a ton, and contrive even to ascend them with their canoes light. Waikanae is a native village about 20 miles S. from Otaki, at the mouth of a small river of the same name. It is in the same style as Petre, and was founded in 1842; but a fresh outbreak has come up an ordinary—an unlimited dinner for a shilling; but as his fellow-citizens prepared themselves for it by fasting the whole of the previous day he found it unprofitable, and restricted the meal to two pounds of pork, two pounds of potatoes, sauce and half a gallon of beer, the latter alone resembling a huge barn, says Colonel Mundy ('Our Antipodes')—and the military coast-road from Wellington passes through it. Wanganui Bay (celebrated as being the scene of the massacre of the crew of the Boyd in 1808) is about 200 miles N. from the Bay of Islands in New Ulter. The entrance to the harbour is narrow, between steep rocks of great height; but the water is deep and the inner harbour is very spacious, and sheltered from all winds. The country around is mountainous, and not adapted for cultivation; but the hills are covered with timber, among which the Kauri pine was particularly abundant, but has been much thinned. A few Europeans are settled here, and there is a native village of about 3,000 persons, with Protestant and Catholic missionaries, and a church and school. Otaki. The name the late Lord Dundas, one of the principal proprietors of Shetland, took the title of Earl of Zetland when elevated to that rank in the peerage in 1838. The name is also retained in the title of the lord-lieutenant and sheriff of Orkney and Shetland. Zetland Islands, also occasionally applied to them. Shetland was called by the Norwegian colonists Hjaltland and Healtland, which became changes into Shetland and Zetland. The name the late Lord Dundas, one of the principal proprietors of Shetland, took the title of Earl of Zetland when elevated to that rank in the peerage in 1838. The name is also retained in the title of the lord-lieutenant and sheriff of Orkney and Shetland. Zetland Islands, also occasionally applied to them. Shetland was called by the Norwegian colonists Hjaltland and Healtland, which became changes into Shetland and Zetland. The name the late Lord Dundas, one of the principal proprietors of Shetland, took the title of Earl of Zetland when elevated to that rank in the peerage in 1838. The name is also retained in the title of the lord-lieutenant and sheriff of Orkney and Shetland. ZEUS, a genius of Fiesha belonging to the family Scombridae. The Boar-Fish of English writers is referred by Jenyns and others to this genius, but Cuvier, Lacépée, and Harrell, refer it to Capros. (Capros.) ZEBRETTE, a sandpiper, is by the ancients called Lapidoptera. The male antennae are furnished at the base with a double row of teeth, which are terminated by a thread: those of the female are single at the base. Z. ZecCEI, the Wood-Leopard, is a rare species, of a white color, with black and red steel-blue spots. The larvae are found in the interior of decaying trees. ZHUKOVSKY, VASILY ANDREEVICH, a Russian poet of the first order of eminence, was born at the village of Mihanskie in the province of Moscovia, in the year 1788, and studied at the university of St.Petersburg. He was chiefly brought up by his mother, grandmother, and aunt, in a household which contained nine girls and three young women, and in which he was the only boy. At school he had at first the reputation of being lazy and very averse to dry studies, while at home his good looks and good nature procured him admittance into the company of the girls into a troop of actors, and at an early age set up a play of his own composition, 'Camillus, or Rome Preserved,' in which he acted the part of the hero with great applause from the neighbours who were invited to the performance. The work was, however, a failure, and having been given him for a theme at school, he produced an exercise of such excellence that it has been inserted as a classical piece in several Russian compilations of the nature of school-books. At this time he began to appear in print by contributing to one of the Moscow periodicals under the signature of the 'Hermit of the Mountain;' and it was remarked, that while gay and lively in society, he was disposed in composition to be mild and meditative. The same appearance is observable for some years between different towns in winter and his native village in summer: and while at the schools of Tula and Moscow he gradually won his way into notice and
distinction by proficiency in study, at the village of Mishenery, which was picturesquely situated on the banks of the Oka, he cultivated his talents for poetry, music, and drawing, for all of which he had a natural gift.

It was at a house within sight of the church and church-yard of a nearby village, a number of which he signed his name,  

'Elegy in a Country Churchyard,' the first production of his pen which made an impression on the public. Gray's  

'Elegy' is at this moment the most universally known and universally popular piece of poetry in existence. Bowring, in his edition, says that he had seen more than one hundred and fifty different versions, and among them Zhukovsky's is undoubtedly one of the best. This fortunate translation, which was published in 1802, was, like Moore's 'Anacreon,' the foundation of a fame which extended throughout the world, and even before it appeared in the 'Viestnik Evropeii, or European Inteligence, 

then the leading periodical of Russia, of which Karamzin, its most popular author, was at the time the editor, and it introduced him at once to the friendship of Rostopchin and Dostoevsky, and in position amid the best literary society of Moscow. A few years later, in 1808 and 1809, Zhukovsky became himself the editor of the same periodical, but he soon relinquished the employment, thenceforward devoting himself to a literary career. In the war of 1812, both Karamzin and Zhukovsky were anxious to bear arms, but the bodily infirmities of Karamzin would not allow him to sit on horseback, and Zhukovsky took leave of him at Moscow at the house of Count Rostopchin, and then resigned, to be joined, to his name, to the army. As a lieutenant of the Moscow volunteers, Zhukovsky fought at the great battle of Borodino, and he took an effective part in the subsequent memorable campaign, both as a bard and a soldier. It was in the former capacity, that the most distinguished of his productions, 'Minstrel in the Russian Camp,' a series of songs on the war, created unbounded enthusiasm among the soldiery, were struck off at a military printing-press, and circulated and sung throughout the army. The poet, however, unaccountably took the part of a man who was, by fever, and obliged to quit the army early in 1813. The Empress mother, Maria Theodorovna, who had been delighted with his poems, was anxious to see and reward the 'Minstrel;' a special audience of the Tsar was granted to herself, and Zhukovsky, who had been decorated with the order of St. Anne for his military services, received from the Emperor Alexander a pension for life of 4,000 rubles. For some years afterwards his time was spent at St. Petersburg, in the employment of imperial favour, of great success in society, and till the rise of the Russian Byron, Pushkin, of the reputation of being the first poet of Russia.

He most poetic productions in this his most productive period were ballads, the first and best of which was the 'Minstrel,' a poem written in the imitation of Pushkin, and which he was the first to introduce into Russian literature. His first poem of the class, 'Zundmilla,' an imitation of Bürger's 'Lenore,' startled the Russian public into a burst of enthusiastic admiration. He afterwards treated the same subject with variations in a poem entitled 'Svietlana,' which is still considered his masterpiece, and finally he translated 'Lenore' itself simply from the German into Russian. Almost all his subsequent ballads are founded on foreign originals, and contrast what some of the best of them do, with the popularity of England, France, and Germany, in looking through the ballads of Zhukovsky, is continually meeting with old faces and old favourites. From Southerly alone, the Russian poet borrowed, without the mention of Southerly, 'A Conversation,' 'The Turnpike,' 'The Rattlesnake,' 'The Muleteer,' 'The Frenchman and Jew,' 'The Marabout of Morocco,' 'Rudiger,' 'The Old Woman of Berkeley,' and 'Lord William,' the title of the last of which he altered to 'Varwik,' the nearest approach which the Russian alphabet allows to the English 'Warwick.' Still more strangely, while the ballads of Smolthom bowers are acknowledged to be taken from Walter Scott, a tolerably close version of the condemnation of Constance, from the second canto of 'Marion' is presented to the reader of Zhukovsky's works, as 'The Trial Underground, a fragment of an unfinished poem.' This mode of proceeding is not confined to Zhukovsky, and

seem to be in accordance with the Russian code of literary ethics: as, though the native critics must be aware of the fact, we have never seen it mentioned with blame. How apt it is to mislead, may be shown from the example of Merimee, who, in his life of the false Demetrius, speaks of the place where the Polabin Bank had been built, as having to be drawn from the Russian Byron, Pushkin, the very curious compliment paid to it in the ballad of 'The Three Sons of Bodrya,' quite unaware that the ballad in question has been transferred without acknowledgment from the Polabin bank in Breslau.

Leaving their origin out of view, the ballads of Zhukovsky are beautiful specimens of animated narrative, and in his own poem of 'Svietlana' (which has been translated into English by Bowring) there is a power and force of what is called the immediate effect, until it is equalled in any language. In his first romantic poem, 'Russian and Ljudmilla,' Pushkin showed a similar power, and Zhukovsky sent a present of his works to him with the inscription, 'From the conquered teacher to his conquering pupil.' They became intimate friends, and around them they were grouped for several years all the most eminent literary society of St. Petersburg, which was in the habit of meeting at Zhukovsky's house. All shreds of opinion were repressed, and Pushkin's name is given to a contribution to 'The Polar Star,' edited by Bestuzhev and Rulilyev, who afterwards perished on the gallowas and in exile for their-sorropby against the Emperor Nicolas. Zhukovsky became more and more connected with the circle of Pushkin, and when Nicolas quarrelled with a Prussian princess, he was selected to teach her the Russian language; and when Nicolas became emperor, and the offering of the marriage, the hereditary prince, was of an age to require a preceptor, Zhukovsky was appointed. A change of residence, from the active pursuit of literature, but enabled him in various ways to set efficiently for the benefit of his literary brethren. It was by the influence of Zhukovsky that Herzen was allowed to return from exile, and that Mikhailovich's 'Memoirs' were at last obtained with permission to quit Russia, which he had entered as a captive. He too had probably a hand in obtaining a pension for Pushkin's widow after the decease of her husband, and the elevation of Pushkin to the new rank of a poet. Zhukovsky, with his Cabinet, visited the vast empire which was to fall under his sceptre, Zhukovsky acted as his Mentor, and he also accompanied him in his visit to Germany, Italy, and England. The poet had made tours in Germany and Italy before, but to England he had not been invited. Zhukovsky's poems had been translated by Bowring, and noticed by Byron, it is probable that the 'Minstrel in the Russian camp' was recognised by few under the disguise of the French appellation on his name—'M. de Jukoffsky.' On his visit to the British Museum however, one of the assistant-librarians, who was a student of Russian literature, had the satisfaction of showing him an edition of his works which had just been added to the national library. Shortly after the prince's return to Russia, his creations in poetry, Zhukovsky's health had for some time been indifferent, and he transferred his residence to Germany, a country of which it is said he was 'passionately fond, to have the benefit of the waters.' He had always been a lover of health and recreation, and had been attained his fifty-ninth year and was still a beaholer. The Hereditary Prince in his European tour had been in search of a wife, and on the 28th of April 1841 he married the present Empress of Russia, the daughter of the grand-duke of Oldenburg, who was a pupil's example. On the 21st of May 1841, at a little Russian chapel on a hill near Canstadt, which was erected over the remains of a Russian princess who had been queen of Wurttemburg, he was married to a beautiful girl of the name of Reutern, and was in the summer of the same year, at the close of one of the Baltic provinces. Six years afterwards he wrote to a friend in raptures at the domestic happiness which had fallen to his portion. He chiefly passed his time at a retreat in the neighbourhood of Dusseldorf, and amused himself with translating into Russian poems by...
Ferdinand and Homer. Two children, both boys, were the offspring of the marriage, and their delight was very great, which he thought his life might be prolonged to his eightieth year to see completed. Neither this wish nor that of revisiting Russia was fulfilled. On the 12th of April 1852, Zhukovsky was met and resigned, at Baden, in the bosom of his family. His remains were afterwards removed to his native country.

An edition of Zhukovsky's works which appeared at St. Petersburg in 1853-57, fills eight octavo volumes, and contains his most of his poems. One of the eleven volumes consists of prose, the remainder are all either original or translated poetry. Among the prose the pamphlet is generally given to a tale entitled 'Marina Roschas' (Mary's Grove), the name of a favourite resort of the inhabitants of Moscow, which ever since the tale appeared has been regarded in the light of a classic spot. There are some fragments of a diary kept by Zhukovsky on his tours in Italy and Germany, which are singularly vivid, but nothing apparent has been said of his common material for packing, and for stuffing ottoger's cushions; it has also been used medicinally as a poultice.

ZOUA, River. [AFRICA, S. 2.] ZSCHOKKE, JOHANN HEINRICH DANIEL, was born at Magdeburg in Prussia on May 29, 1771, and received the earlier part of his education in the Kloster-shule and in the gymnasiurn of that town. When only seventeen he quitted his school and family, and became play-writer to a troop of strolling-players. In a short time, with consummate skill, he had become a theatrical manager, and was sent to the university of Frankfurt-on-the-Oder, where, without any settled plan, he studied philosophy, theology, the fine arts, history, and finance. In 1792 he commenced private teaching in Frankfurt, but with little success; and he employed most of his time in writing stories. In 1793 he published 'his 'Abillino, the Bandit' (of which the story was borrowed by Monk Lewis for his 'Bravo of Venice'), and 'Julius von Sasson,' produced at this period, were favourably received. In 1794 he wrote the first part of 'Atlas, a poetick edict respecting religion, and therefore when in 1796, he applied for a professorship it was refused. He then left Frankfurt, travelled about Germany and France, and at length settled at Reichenau in the Graubunden, where, in conjunction with Eckermeyer, he established a school for boys, which was so well conducted that the canton presented him with its freedom as a burgher, and he evinced his gratitude by writing his 'Geschihte des Freistaats der drei Bünde in Rhaetien' (History of the Free State of the Three Bunds in Raetien), which was published in 1790. This is an account of the early associations of the canton for the establishment of its liberties, and was the precursor of several other works on the history of Switzerland.

In that year however the Canton of Graubunden declined to join the Helvetic republic, and was sent to the university on the French influence; Zschokke was in favour of the union; he became unpopular, and his school was the sacrifice. Austrian troops entered the canton, and Zschokke withdrew to Aarau, where the central government of the canton invited him to establish a school for the training of talents, and his political opinions, procured him employment under the government. He was made chief of the department of education, and was sent in the capacity of a fully empowered commissioner to the commission for the affairs of Unterwalden, the suffering from the devastation of the foreign enemy and the effects of party violence, where he acted as a true benefactor and a restorer of peace. A memorial of this remarkable period is given in his 'Historischen Denkwürdigkeiten der Schweizische Staatsm.-würmung.' (Historical Memoirs of the Swiss Revolution). His commission was subsequently extended over the cantons of Uri, Schwyz, and Zug, and his appeals for the help of the miserable sufferers remain in proof of his skill in the years of eleventh the year 1801, to the commission for the affairs of Unterwalden, the suffering from the devastation of the foreign enemy and the effects of party violence, where he acted as a true benefactor and a restorer of peace.

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ZOARCE, Grau Wrecks, a natural order of Endogenous Marine Plants, resembling sea-weeds, and living among them. The species have grassy thin leaves, which are usually in a mass; the flowers are absolutely naked, or surrounded by three scales. If we are to find anywhere a positive interrelation of flowering with flowerless plants, it is here, where, with waked flowers but distinct sexes, the pollen is in a condition that may be brought to the requisite form and position of the little, and totally different from all that is known of other flowering plants. The habit too is quite that of sea-weeds. The manner in which fertilisation takes place among these plants is unknown. The bottom of the tube is thickened, and they occur in shallow waters extending to the Mediterranean, the Indian Ocean, and the coasts of Arabia. One species only is seen on the shores of Australia, and another in the West Indies.
governor of Basel, where a commotion had arisen against the land-tax and tithes; he there threw himself into the midst of an armed assemblage of the people, and induced them to follow his advice and submit. When the central government at Bern, with the Landmaß Aloys Reding at its head, prepared in 1801 to restore the ruptured federalism of the union, Zschokke resigned his office, as he doubted whether the attempt could be successful then, and he retired to Biberstein in Aargau, to devote himself to his favourite studies. Much civil contention arose, and a civil war seemed inevitable, when in October 1802, Bonaparte offered his mediation, and by it the federal union of Switzerland was established in 1803. The modification brought Zschokke again into political activity. He was presented with the citizenship of Aargau, and nominated by the government in 1804 a member of the council of mines and forests. In the same year he commenced his popular "Schweizerboten" (Swiss Messenger), and in 1807 his "Miscellen für die neueste Weltkunde" (Miscellany of the most recent Events), which was continued without interruption till 1813; it displayed a happy choice of subjects, a richness of contents, a conscientious liberalism, and in general a strong and correct judgment. In 1813, when the Swiss after the downfall of Bonaparte, again wished to reconstitute their constitution, Zschokke exerted himself to maintain peace in Aargau, while he strenuously defended its independence against the claims of Bern. In 1829, in consequence of some imputations against him as editor of the "Schweizerboten," he resigned his offices of church and forest inspector, but retained those of member of the council, of the school directory, and president of the directorate of the school of education for artisans. In 1830 he was re-chosen a member of the church council, and he continued to exert himself actively and effectively in the promotion of education and all social reforms, though his time was now chiefly given to literary composition. With these duties and his literary works, which became extremely numerous, he continued to occupy himself until his death, which took place at Biberstein, on June 27, 1848. His published works are of very varied character. We have noticed some of his historical and political productions, but in this class the most valuable are his "Geschichte des Bayerischen Volks und seiner Fürsten" (History of the Bavarian People and their Princes), 1813-18; and "Das Schweizerlandes Geschichte für das Schweizervolk" (History of Switzerland for the Swiss People), 1822; which are highly esteemed, have been frequently reprinted, and are distinguished by a lucidity of arrangement, clearness of perception, a keen insight into character, and warmth and passion of expression; com. novels and tales of all other classes in number. Among the best are his "Adventures of a New Year's Night," which was translated into "Blackwood's Magazine," "Jonathan Frook," a serio-comic novel, "The Dead Guest," and "The Goldmaker's Village." His merits are a correct delineation of the nicer shades of character, a naturally simple pathos, a happy exposition of some of the weak points of our social institutions, a considerable amount of humour, and a constant maintenance of good principles and feelings. Some of these novels, like the "Cottagers of Glenburnie," aim at effecting the removal of social evils, national prejudices, or injurious customs, such as "Die Brantwincest" (The Brandy Pest); he is frequently tedious, and his plots are improbable, and the least happy of his attempts are of the historical class. His poetry seldom rises beyond mediocrity, nor are his dramatic attempts of a high character. He had much knowledge of a kind fitting him for his office of inspector of forests, and was acquainted with geology, particularly in reference to the country in which he resided, as is shown in his "Gebirgsförster" and "Die Alpenwälter." By far the most popular of his works was his "Stunden der Andacht" (Hours of Devotion), which was first published as a Sunday periodical, and which has gone through forty editions. It is one of the most complete expositions of modern rationalism, but its want of orthodoxy was held to be compensated by its fervid eloquence, and its zealous inculcation of every practical duty in all ranks. This work was not known to be his till the appearance of his "Selbstacht," a sort of autobiography of a somewhat singular character, which has been translated into English. He published a collected edition of his historical writings, in 1830, in 16 volumes, and a selection of his novels and poems in 10 volumes, in 1847; but an edition of his collected works, in 1829, occupied 40 volumes. Many of his works have been translated into French, and in English we have his "Gol- dental," a tale; "Der Goldmachersordor:" "Love's Strategem," and other tales; "The History of Switzerland," 1 volume of select essays; and the "Stunden der Andacht," under the title of "Hours of Meditation and Reflection."